The RUBBER AGE

September, 1942

TECHNOLOGY DEPT.

TYSONITE

TYSONITE is an organic rubber-like plastic with a specific gravity of 1.04. It is resistant to water, ozone and many chemicals.

TYSONITE is supplied both in dry solid form and as a water dispersion of 60-62 per cent solids.

TYSONITE can be used in many products to replace rubber in part or entirely.

• • • In your efforts to produce rubber-like goods with less rubber or without rubber you can well afford to work with **TYSONITE**

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York City

Newsletter No. 9 *PUBLISHED BY RUBBER CHEMICALS DIVISION OF* DU PONT *SEPT., 1942*

Thionex in Buna S Compounds Improves Physical Properties

BUNA S is similar to rubber in many respects. It responds to many vulcanization accelerators in much the same manner as natural rubber.

BASIC COMPOUND—Sulfur, or a similar vulcanizing agent is necessary for the vulcanization of Buna S. However, smaller quantities are required than in rubber stocks. Small amounts of stearic acid should be used. Zinc oxide, or a similar metallic oxide is required. Anti-oxidants generally need not be included.

Pure gum stocks have very low tensile strength, modulus, and elongation at break. Fortunately, Buna S is reinforced materially by the addition of carbon black. Semi-reinforcing and soft blacks are less effective than channel black on an equal volume basis.

THIONEX ACCELERATION OF BUNA S—Many common rubber accelerators of the thiazole, thiuram, or thiazoline types are effective accelerators. For Buna S one of the most interesting is Thionex which is chemically tetra-methyl-thiuram-monosulfide. Thionex is a lemon-yellow powder having a specific gravity of 1.39 and a melting point of 107°C. It is non-toxic when used in rubber as recommended. Thionex accelerated Buna S stocks are characterized by:

(1) Inactivity at processing temperatures.

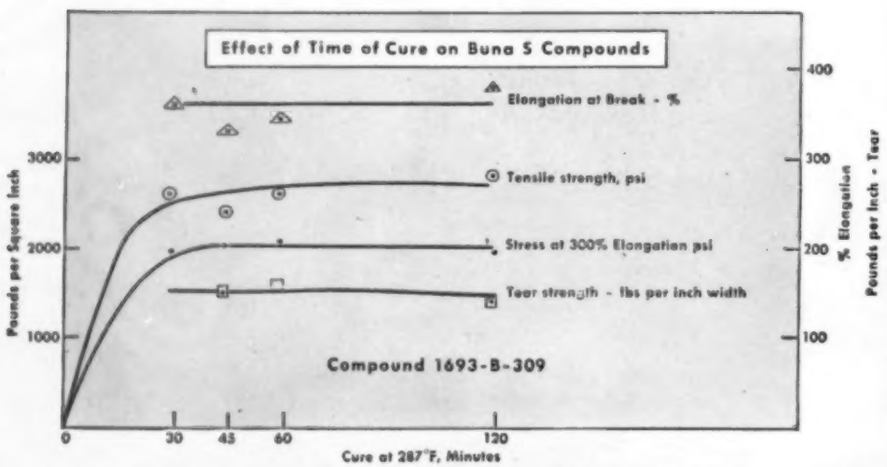
(2) Rapid rate of cure at vulcanizing temperature of 274°F. or higher and broad curing range.

(3) Excellent physical properties imparted—high tensile strength, modulus, and elongation at break. Resistance to deterioration on normal or heat aging.

One outstanding and important difference has been noted in the effect of Thionex on rubber and Buna S. Whereas with rubber acceleration with Thionex alone often results in sharp peak cures with rapid reduction in physical properties on extended cure, in Buna S Thionex causes rapid vulcanization at 287°F but there is practically no indication of change in tensile strength, modulus, elongation at break, tear strength, or hardness when the time of cure is extended from 30 to 120 minutes. The effects on these properties of varying the time of cure is shown graphically in the accompanying chart, Figure I.

THIONEX provides very economical acceleration for Buna S compounds. At the present low price it is economical to use alone. Further economy as well as other advantages for certain types of products may be gained by activating Thionex with either Accelerator 808 (a butyraldehyde-aniline condensation product) or DPG (diphenylguanidine).

More detailed information concerning the compounding of Buna S, including specific acceleration suggestions, are presented in a recent report. It is available without charge to rubber manufacturers.



Through the Mill

THE ALLOCATION CLASSIFICATION SYSTEM *covered by the War Production Board's Priorities Regulation No. 10 went into effect July 1, 1942. In compliance with the regulation, we are unable to accept any order unless the appropriate purchaser's symbol (USA, USN, LL, FP, or DP) and the proper allocation classification number is shown on the face of the order.*

Some neoprene purchasers have assumed that the end uses shown on their questionairre to the WPB covered the classification of their needs and eliminated the requirement for end use symbols and numbers on their orders. This assumption is incorrect as these symbols and numbers are required on each order for neoprene. Omission of these symbols has frequently delayed the shipment of neoprene to the user.

BUNA S *is expected to replace natural rubber at an accelerating rate during the coming months as additional plants begin producing this material. As discussed in the adjacent columns, we are conducting an intensive research program on Buna S compounds. We believe we can help you with any problems of Buna S compounding with which you may be confronted. We hope you will continue to bring these problems to us so that we may work together in the development of the best possible Buna S compounds.*

NEOPRENE LATEX TYPE 571 *is the preferred type of neoprene latex for most purposes. Because of its greater availability, it should be used in place of the older types for spraying, dipping, impregnating and molding by gelation. We have developed compounds of Neoprene latex Type 571 which are particularly suited for each of these processes, and will be glad to give you the results of our experience.*

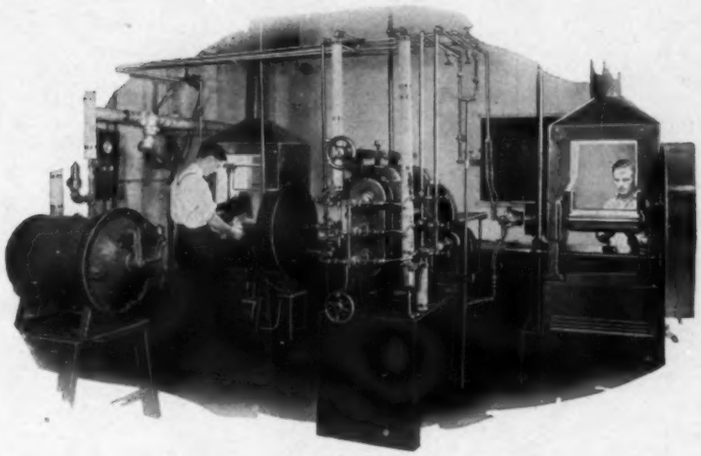
RUBBER CHEMICALS DIVISION

Wilmington DU PONT *Delaware*

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year. Canada, $3.50; Foreign, $4.00. September, 1942. Vol. 51, No. 6.

TECHNOLOGY DEPT.

Make this laboratory your pilot plant



Here is a part of Hycar's Customer Service laboratory, planned, designed, equipped and staffed for just one purpose: *To help you get the most out of the many remarkable properties of Hycar Synthetic Rubbers.*

In this laboratory our research engineers and technicians every day are helping rubber fabricators with specific problems, problems of compounding, working technique, control of physical characteristics, production, and a host of others. And they are solving these problems the only practical way they *can* be solved—by actual test.

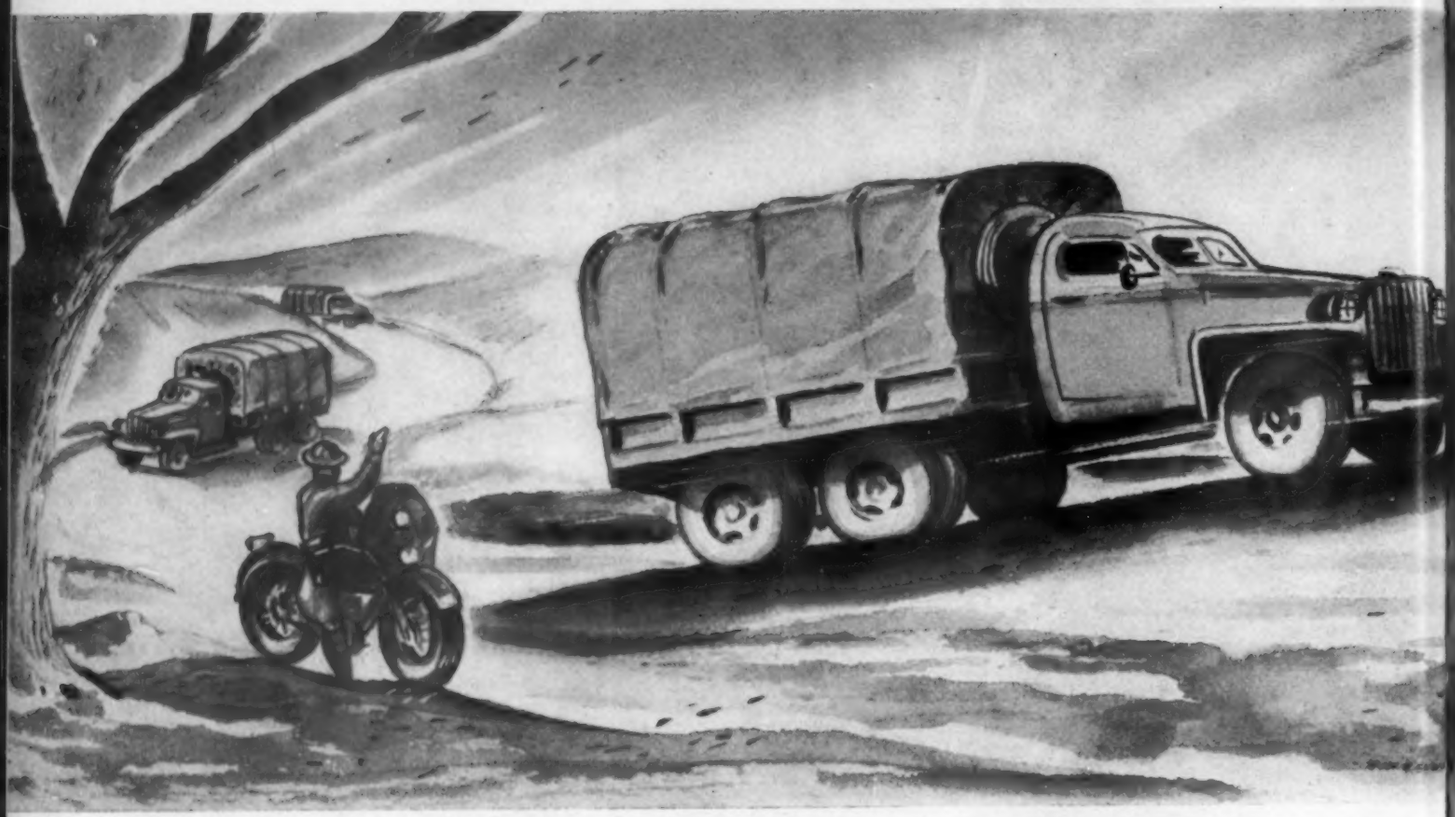
Make this completely equipped laboratory your pilot plant. Bring your synthetic rubber problems to Hycar's engineers, highly trained, fully experienced and progressive. Their job is to help you. Their long record of achievement is assurance that they can.

HYCAR CHEMICAL COMPANY, *Akron, Ohio*

HYCAR *Synthetic* **Rubber**

LARGEST INDEPENDENT PRODUCER IN AMERICA OF BUTADIENE SYNTHETIC RUBBER

OUR ARMED FORCES ROLL ON RUBBER



KEEP YOUR PRODUCTION *Rolling*

with CLIMCO PROCESSED LINERS

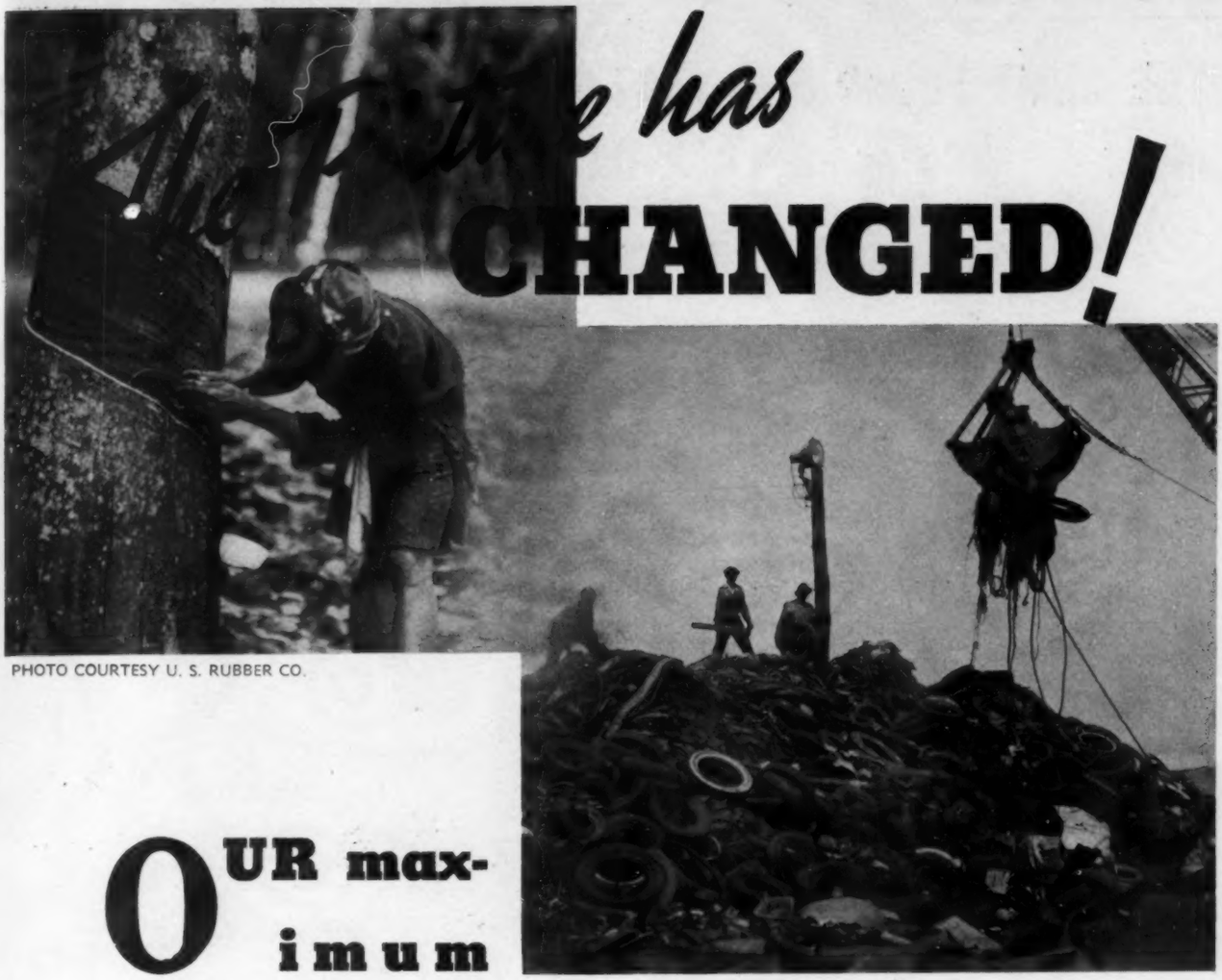
★ In the past twenty years Climco Processing has been recognized throughout the rubber industry as an important method of reducing costs in the handling, storage and separation of uncured stocks. ★ Today Climco Processing is of even greater importance, because it helps meet the urgent demand for more and faster production. By eliminating stock adhesions, speeding-up separation, and keeping the liners in uninterrupted service for a longer time, Climco Processing saves valuable time, as well as reducing the cost of labor, power, and liner replacements. ★ For faster and more uniform production, it pays to have your liners Climco Processed. Write now for a detailed explanation of the advantages of Climco Processing.

THE CLEVELAND LINER & MFG. CO.
CLEVELAND, OHIO

CLIMCO

LINERETTE
INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

CLIMCO PROCESSED LINERS
For Faster, Better Production at Lower Cost



The Picture has CHANGED!

PHOTO COURTESY U. S. RUBBER CO.

OUR maximum effort is now devoted to developing the supply of Scrap Rubber that the Rubber Industry may perform its splendid war-time service.

H. MUEHLSTEIN & CO., INC.

122 EAST 42ND STREET, NEW YORK, N. Y.

CHICAGO	AKRON	LOS ANGELES	MEMPHIS	BOSTON
327 So. La Salle St.	250 Jewett St.	318 W. 9th St.	62 Auction Ave.	31 St. James Ave.

THE ARMY FOUND OUT THAT A 24% CRUDE RUBBER STOCK COULD REPLACE ONE CONTAINING 32%

U. S. Army Signal Corps photo

The Army is encouraging the use of reclaimed rubber for field wire.

Specifications for field wire insulation formerly required at least 32% crude.

Recent tests have shown that by using a percentage of reclaim a stock containing but 24% crude meets all specifications.

This is but one example of how Pequanoc reclaims are helping to conserve this vital material. Your inquiries are invited.

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

BUTLER **NEW JERSEY**

SALES REPRESENTATIVES

Robert Knoblock
2301 Lincoln Way West
Mishawaka, Indiana

Harold P. Fuller
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Boston, Mass.

E. B. Ross
No. 1 Toronto Street
Toronto, Ontario, Canada

Burnett & Co. Ltd.
46 Herga Court
Harrow-on-Hill
Middlesex, England

LEADING MANUFACTURERS OFFSET EXTRA HEAT IN HEAVY-DUTY TIRES WITH Continental "AA" CARBON BLACK

THOROUGH TESTS in actual tire formulations have definitely proved that Continental "AA" Carbon Black contributes substantially less to heat generation than do standard blacks. That is why outstanding manufacturers of heavy-duty tires are changing over to this new type black. For it is the terrific heat generated by such tires in high-speed operation that most often causes tire failure.

Continental "AA" is specially processed to offset this extra heat. Its low heat generating characteristics maintain just the right balance between wear resistance in the tread compound and heat generation in the tire itself. In the production of today's heavy-duty tires—particularly tires designed for truck, bus and combat service under the worst in climatic extremes and the most severe treatment—Continental "AA" fills a vital need.

THIS NEW BLACK IS EASIER PROCESSING, TOO!

The ease with which Continental "AA" may be processed gives it still another advantage over standard grades of black used in passenger car tires. And of course, the same high quality that characterizes all grades of Continental Black has been maintained, through traditional methods of rigid laboratory control. But send for samples —find out for yourself how completely Continental "AA" meets your every requirement today.

ESPECIALLY IN YOUR BUNA S FORMULATIONS

Now is the time to evaluate the characteristics of Continental "AA" in your Buna S formulations. Let us send you additional samples for this purpose—while you are still experimenting with this type synthetic rubber.

Continental CARBON COMPANY

295 MADISON AVENUE • NEW YORK, N. Y.

Akron Sales Office: Peoples Bank Building, Akron, Ohio • SALES REPRESENTATIVES: Ernest Jacoby & Co., Boston, Mass. • Marshall Dill, Los Angeles and San Francisco, Calif.

America's Secret Weapon

You won't find it on the production lines at Rock Island or Willow Run.

It isn't guarded at the Brooklyn Navy Yard, or tested at Aberdeen.

But it's the toughest weapon these men you are looking at will ever take into battle. It's the stuff with which all our wars are won.

The boy in the uniform doesn't call it *morale*. That's a cold potatoes word for something John American feels deep and warm inside.

Perhaps he can't give it a name. But he can tell you what it's made of.

It's made of the thrill he gets when his troop train stops at a junction point and fifty good-looking girls are at the station with cigarettes.

It's made of the appreciation he feels for a bright new USO clubhouse where he and his friends can go for a few hours' rest and relaxation.

It's made of laughter and music—when Bob Hope or Lana Turner visits his camp with a USO show.

It's made of his invitations to the homes of pleasant strangers.

It's made of a cup of coffee and a Yankee smile—at some lone outpost in Alaska or in the Caribbean.

Maybe it's just a feeling of kinship with this land of a hundred million generous people. Maybe it's just the understanding that this whole country cares; that the soldier is bone of our bone; that he and we are one.

Name it if you can. But it's the secret weapon of a democratic army—a weapon that can never be *ersatzed* in Germany or Japan.

What can you do to sharpen this weapon? Give to the USO. This great national service organization that overrides race and creed has been entrusted by your government with responsibility for the service man's leisure needs. With maintaining clubhouses and providing camp shows, with a hundred thoughtful services to our men at home and abroad.

The needs of USO have grown as enormously as our armed forces themselves. This Spring we must have $32,000,000.

Give all you can—whether it's a lot or a little.

Send your contribution to your local chairman or to USO, Empire State Building, New York City.

★ USO ★

VISION

Production Possibilities Without Rubber . . .

A new horizon of production possibilities has opened up to the engineers and chemists who have seen and tested Standard's NEW product . . . So much has been discovered about this compounded extender it seems destined to give and sustain great impetus to the production of thousands of items for which little or no rubber is available . . . This product is of low cost, incorporates easily with reclaim and other materials —and for some products may be used alone. It can make your allotment of reclaim go 25% to 50% farther.

Laboratory tests are not complete on this compounded extender, therefore we cannot send complete data. We will send samples for testing in your own laboratory if you write, wire or phone us now.

STANDARD

Chemical Company

AKRON SAVINGS AND LOAN BLDG. AKRON, OHIO

Wedded To Quality

The HIGHEST QUALITY OF ZINC OXIDE is more than a phrase —it is a policy—it is more than an idea, it is an ideal—it is more than a mere statement, it is a manual of method. This perhaps explains why, throughout normal times and periods of great national stress as well, the end of one transaction with St. Joe is the beginning of another. Our customers are wedded to our policy of HIGHEST QUALITY.

ST. JOSEPH LEAD COMPANY
250 PARK AVENUE, NEW YORK, N. Y.

MADE BY THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES

Uncle Sam needs EVERY OUNCE of RUBBER

★ ★ ★ ★ ★ ★ ★

Avoid waste by using

CAPITOL LINER TREATMENT

IT is not only patriotic, but plain common sense, particularly today, to preserve vital products such as rubber and to endeavor in every way to avoid waste.

Loss of materials, time and money in rubber processing may be avoided by the use of the Capitol Process Liner Treatment for the prevention of adhesion in rubber stocks, a fact recognized by our many satisfied users.

Let us prove the effectiveness of the Capitol Process Liner Treatment. SEND US A 50 OR 100-YARD LINER WHICH WE WILL TREAT GRATIS. Then convince yourself, in your own factory, of its excellence in preventing the adhesion of rubber stocks and preserving the life of the cotton fabric, thus cutting down purchases of piece goods. Fair enough?

★

TEXTILE PROOFERS, INC.

ONE GATES AVENUE JERSEY CITY, N. J.

For **A BETTER LOOKING PRODUCT**

For **MORE CURES PER MOLD CLEANING**

REPLACE FATTY ACIDS

WITH PARA LUBE + SL-20
(EQUAL PARTS)

Equal parts of Para Lube and SL-20 is a C. P. Hall development that does the job of fatty acids ***better*** and ***more economically.***

Such a significant improvement in the manufacture of molded rubber products surely deserves your attention.

The C. P. Hall Company invites you to test this formula in your own plant or laboratory. See how PARA LUBE + SL-20 cuts costs . . . insures cleaner and quicker knockout . . . gives maximum number of cures per mold cleaning!

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
AKRON • BOSTON • LOS ANGELES • CHICAGO

BAIRD

MANUFACTURERS' CRUDE RUBBER PURCHASE PERMITS

▲

• Our long experience since 1903, together with our friendly relations with our old and new customers ideally equips us for the prompt, efficient and thoroughly satisfactory handling of

Manufacturers' Crude Rubber Purchase Permits

• We shall continue to appreciate and respect the business of our old friends and assure the new ones that their orders will be handled with courtesy and efficiency . . . . . .

▲

BAIRD RUBBER & TRADING CO., Inc.
WOOLWORTH BUILDING
233 Broadway New York

BARCLAY 7-1960

WILLIAM T. BAIRD, JR. COLLIER W. BAIRD
HAROLD W. HOLCOMBE DENIS P. MOCHARY

Because Rubber is so Vital

TO THE NATION'S WELL-BEING

Medical and surgical rubber goods employing C-700 Hydrated Aluminas as reinforcing pigments have much in their favor. The rubber has unusually high resistance to hot and cold tear, and high strength and elasticity. It has superior aging characteristics. Because this pigment imparts no color to the rubber, these products have greater transparency.

With many rubber products, you are able to conserve much-needed crude rubber by using C-700 Aluminas. Higher pigment loadings are possible and additional diluents can be used, while retaining the physical qualities required by Federal specifications. The rubber has high modulus with high resistance to abrasion, low specific gravity, high resilience and rubbery properties, even with these high pigment loadings.

C-700 Aluminas, used as reinforcing pigments, may enable you to help make our national rubber supply go farther. We'll gladly send you samples for trial in your own plant. Write ALUMINUM COMPANY OF AMERICA (*Sales Agent* for ALUMINUM ORE COMPANY) 1970 Gulf Building, Pittsburgh, Pennsylvania.

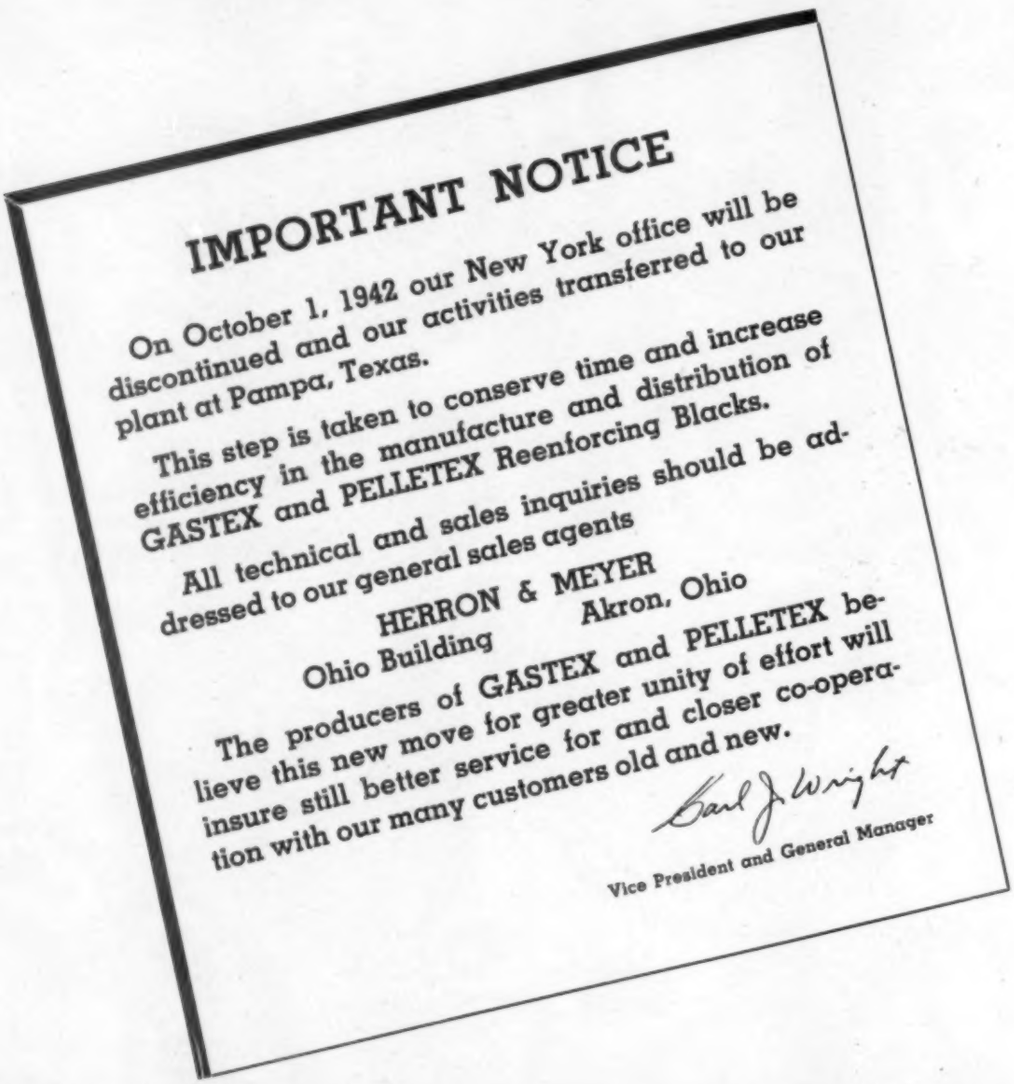
ALORCO

ALUMINUM ORE COMPANY

ALUMINUM AND FLUORINE COMPOUNDS

GASTEX and PELLETEX

REENFORCING BLACKS



IMPORTANT NOTICE

On October 1, 1942 our New York office will be discontinued and our activities transferred to our plant at Pampa, Texas.

This step is taken to conserve time and increase efficiency in the manufacture and distribution of GASTEX and PELLETEX Reenforcing Blacks.

All technical and sales inquiries should be addressed to our general sales agents

HERRON & MEYER
Ohio Building Akron, Ohio

The producers of GASTEX and PELLETEX believe this new move for greater unity of effort will insure still better service for and closer co-operation with our many customers old and new.

Earl J. Wright
Vice President and General Manager

GENERAL ATLAS CARBON DIVISION

OF GENERAL PROPERTIES COMPANY, INC.

GASTEX

SIXTY WALL STREET, NEW YORK, N. Y.

Plants: Pampa, Tex.; Guymon, Okla.

PELLETEX

SALES REPRESENTATIVES

ERNEST JACOBY & CO.
Boston

THE C. P. HALL CO. OF CALIF.
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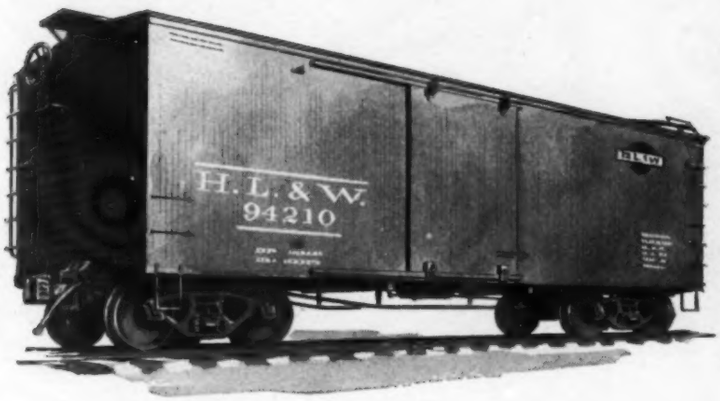
HERRON & MEYER
Akron • New York • Chicago

H. M. ROYAL, INC.
Trenton, N. J.

ST. LAWRENCE CHEMICAL CO., LTD.
Toronto • Montreal



How to Fill Box Cars with Fuel Oil

THE Mareng cell for transporting fuel oil by rail is a huge collapsible synthetic rubber container that holds 2250 gallons. Six Mareng cells installed in a box car transform the car into a rolling tanker capable of hauling approximately 50 per cent more fuel oil than the average cylindrical tank car. On arrival at their destination, the cells can be collapsed into small bundles and shipped back for refilling.

As a means of getting fuel oil to factories and homes that may this winter be lacking it because of the shortage of oil transport facilities, the Mareng cell is currently receiving intensive tests. The Association of American Railroads and Government officials recently inspected a successful test unit which rolled into Washington from "Somewhere in Indiana."

The Mareng cell — so called for the Glenn L. Martin Company which holds patents on the device — is fabricated of Thiokol* synthetic rubber by the U. S. Rubber Co. Heavy duck covered inside and out with layers of Thiokol* synthetic rubber gives the cell complete resistance to fuel oil, to moisture, and necessary flexibility and strength.

Have you in mind applications for Thiokol* synthetic rubber which will help us win the war faster? For over thirteen years we have been cooperating with companies using various Thiokol* types for hose, linings, molded parts, and many other industrial products. Our experience is yours for the asking.

Thiokol Corporation, Trenton, N. J.

"AMERICA'S FIRST"

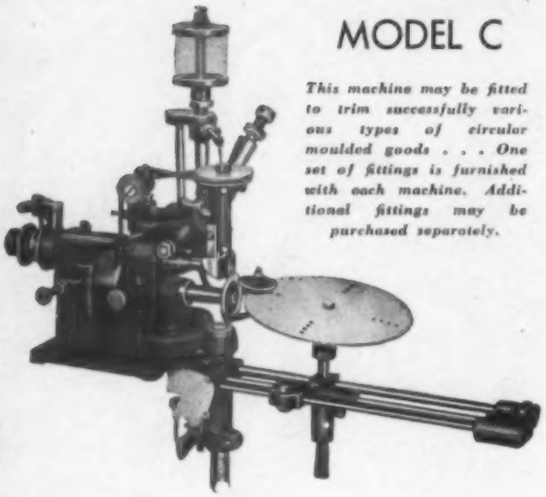
Thiokol

SYNTHETIC RUBBER

*Thiokol Corporation trade mark reg. U. S. Pat. Off.

USMC TRIMMING MACHINE

MODEL C

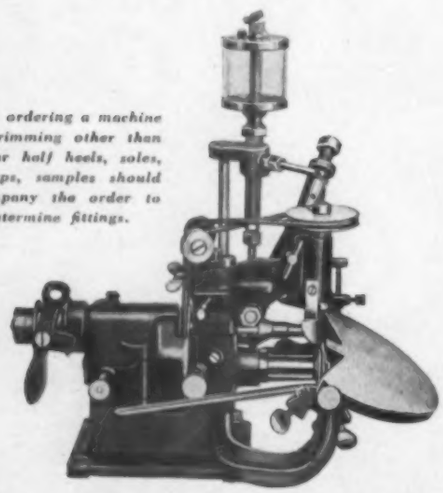


This machine may be fitted to trim successfully various types of circular moulded goods . . . One set of fittings is furnished with each machine. Additional fittings may be purchased separately.

A new and improved machine for trimming the overflow on all types of moulded rubber heels, soles, taps, and miscellaneous moulded rubber goods of similar construction.

Oil is the standard means of lubrication. A water tank is shipped, only when specifically ordered, at an extra charge.

When ordering a machine for trimming other than regular half heels, soles, or taps, samples should accompany the order to determine fittings.



UNITED SHOE MACHINERY CORPORATION

140 Federal Street, Boston, Mass.

Auburn, Maine..38 Minot Ave.
Brockton, Mass.....93 Centre
Chicago, Ill...500 So. Franklin
Cincinnati, O...407 East Eighth
Harrisburg, Pa...20 So. Fourth
Haverhill, Mass.....145 Essex
Johnson City, N. Y.
19 Jennison Ave.
Lynn, Mass.....329 Union
Milwaukee, Wis...922 N. Fourth
Nashville, Tenn., 901 Church St.
New York, N. Y., 110 Fifth Ave.
Philadelphia, Pa., 221 No. 13th
Rochester, N. Y.
60 Commercial St.
St. Louis, Mo.
2206 Washington Ave.
San Francisco, Cal., 859 Mission
Worcester, Mass....71 Mechanic

PREVENT BIN-CURE with CRYSTEX insoluble SULPHUR

CRYSTEX has recently demonstrated its ability to prevent bin-cure and dryness which usually occur when a reclaim compound is used.

CRYSTEX is an amorphous sulphur especially prepared to prevent bloom in uncured rubber stocks.

CRYSTEX should be used in place of rubbermakers' sulphur where repair treads or retreads are put up without a cushion. Where a cushion is put on the tread, and Holland on top of the cushion, it is only necessary to employ CRYSTEX in the cushion.

Write to our nearest office for a working sample and complete information on CRYSTEX (insoluble) Sulphur.

OTHER RUBBERMAKERS' CHEMICALS

Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure—Refined Rubbermakers' Sulphur, Tube Brand, 100% Pure—Caustic Soda — Carbon Tetrachloride — Sulphur Chloride — Carbon Bisulphide

Stauffer CHEMICALS

STAUFFER CHEMICAL CO.

420 LEXINGTON AVE., NEW YORK, N. Y.
230 NO. MICH. AVE., CHICAGO, ILL.
624 CALIFORNIA ST., SAN FRANCISCO, CAL.
555 SO. FLOWER ST., LOS ANGELES, CAL.
424 OHIO BUILDING, AKRON, OHIO
NORTH PORTLAND, OREGON
FREEPORT, TEXAS APOPKA, FLORIDA

WE ARE SERVING UNCLE SAM

Operating under the direct control and supervision of the Rubber Reserve Co. — a Federal agency — in the purchase and handling of scrap rubber, we are loaning our experience and organization to the promotion of the war effort and have ceased to operate on our own account for the period of the emergency.

We are honored in having this opportunity to do our part in helping to overcome the rubber shortage.

Serving the Trade since 1868

THE LOEWENTHAL CO.

188 W. RANDOLPH ST.
CHICAGO, ILL.

159 CLEWELL ST.
AKRON, OHIO

AZO

ZINC OXIDES

ZZZ·11

AZO ZZZ 11 was developed to meet the requirement for greater stiffness, and for use where cutting is an important factor. AZO ZZZ 11 is a lead-free acicular zinc oxide that produces a more rigid uncured stock. The needle-like particles in this pigment add to the stiffness of rubber, increasing wearability without great loss of resiliency. Solve your rubber compounding problem with this easy processing, uniform, absolutely clean pigment.

AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

COLUMBUS, O. CHICAGO ST. LOUIS NEW YORK

Outstanding NEW USE

for a LONG-ESTABLISHED PRODUCT

AC

PARRAS

Washed and Dried

GUAYULE

TACKIFIER and EXTENDER for

BUNA S

DISTRIBUTED BY

RUBBER RESERVE COMPANY

•

AMERICAN CYANAMID

& CHEMICAL CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

30 ROCKEFELLER PLAZA · NEW YORK, N. Y.

REPRESENTATIVES OF CIA HULERA DE PARRAS, S. A., MEXICO, PRODUCER

CALCINED MAGNESIA
For Neoprene

Three types to meet all requirements of quality and cost.

- **LIGHT**—The highest type for the most exacting compounds. Fine particle size. Low moisture and carbonate content.
- **MEDIUM**—For requirements less exacting and where costs must be kept down. Fine particle size and low moisture content.
- **HEAVY**—Meets the need of lowest cost where high type compounding is not essential.

Write for samples, prices and additional information

WHITTAKER, CLARK & DANIELS, INC.

260 West Broadway, New York City **Plant, South Kearny, N. J.**

SALES REPRESENTATIVES

Chicago: Harry Holland & Sons
Philadelphia: Peltz & Company
Toronto: Richardson Agencies, Ltd.
Cleveland: Palmer-Schuster Company

2886

NOTICE—To Users Of
LATEX

· NORMAL · CONCENTRATED · PROCESSED

We have stocks of normal and concentrated latex for prompt shipment against Rubber Reserve Company permits. We also process and compound such latex to meet individual requirements.

Reclaimed Rubber Dispersions

Many other substitutes are available for purposes where latex is not permissible at present.

Write us for further information.

Trade Mark

HEVEATEX CORPORATION

78 GOODYEAR AVE. MELROSE, MASS.

Trade Mark

• NEW YORK, N. Y. • CHICAGO, ILL. • AKRON, OHIO •

PERBUNAN

TRADE MARK REG. U. S. PAT. OFF.

(1) a singularly useful synthetic rubber made from petroleum.

PERBUNAN

TRADE MARK REG. U. S. PAT. OFF.

(2) where resistance to oil is especially required.

PERBUNAN

TRADE MARK REG. U. S. PAT. OFF.

(3) where resistance to heat or cold is especially required.

PERBUNAN

TRADE MARK REG U. S. PAT OFF.

(4) where long life is especially important.

NOTE: Perbunan is now entirely allocated by the Rubber and Rubber Products Branch of the War Production Board. We may, however, sell up to 200 pounds per month to customers conducting experimental work.

PERBUNAN

Reg U.S. Pat. Off.

Write

STANCO DISTRIBUTORS, Inc.

26 BROADWAY, NEW YORK CITY

Maintain warehouse stocks in New Jersey, Louisiana and California

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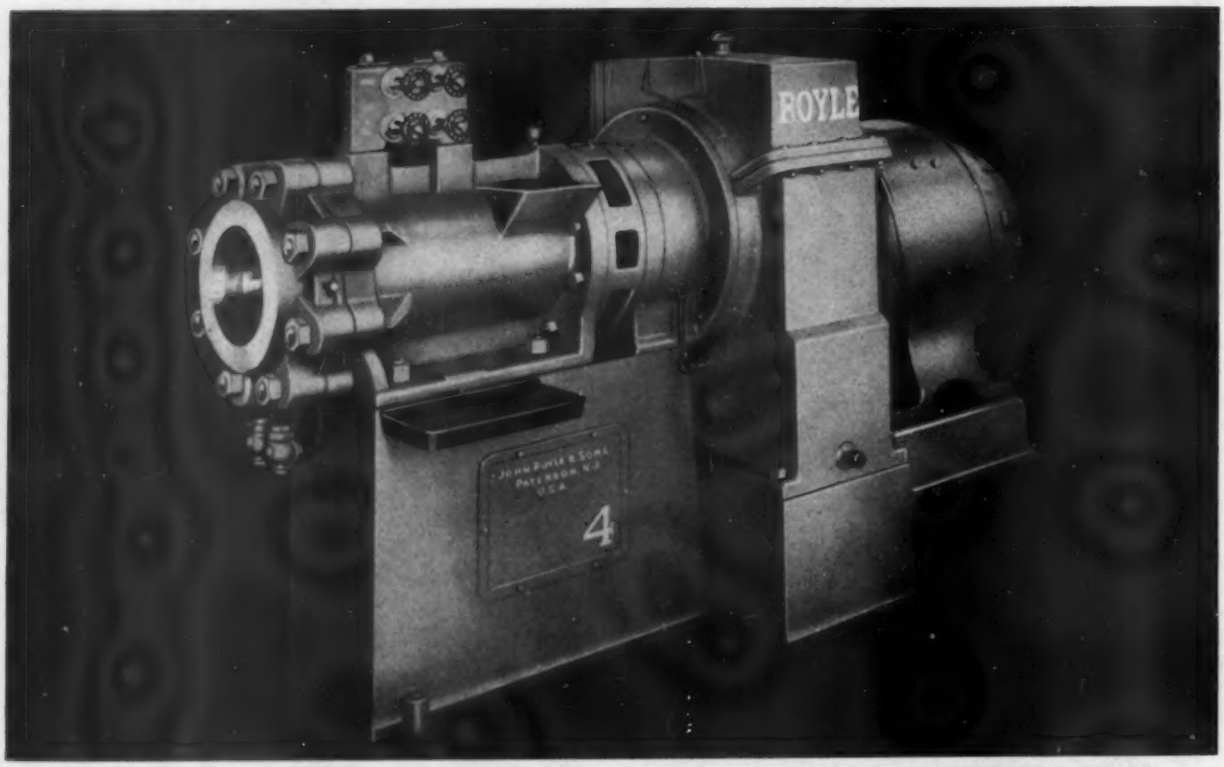

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The RUBBER AGE

VOL. 51, No. 6 SEPTEMBER, 1942

Guayule Rubbers in Wire and Cable Insulation

By R. E. MORRIS[1], F. J. GORMAN[2], T. A. WERKENTHIN[3], AND J. B. LUNSFORD[4]

THE purpose of this report is to point out the suitability of the guayule rubbers as substitutes for Hevea rubber in wire and cable insulation. Although the work reported herein is of a preliminary nature, the results are believed to serve the above purpose well enough to warrant their publication at this time.

Preparation of Test Specimens

Similar wire insulation stocks were prepared from the three available guayule rubbers, *viz.*, domestic deresinated, domestic resiniferous and Mexican resiniferous, and from smoked sheet for comparison. The guayule rubbers are characterized by their resin contents as determined by acetone extraction. The resin contents of the three guayule rubbers and smoked sheet used in these tests are given in Table I. Further information on the guayule rubbers can be found in a previous article *(5)*.

The basic formula for the wire insulation stocks is given in Table II. This formula is for a high quality 40% rubber insulation of the type used in continuous cures. The authors recognize that adjustments of accelerator and sulfur would probably be required before the guayule stocks could be placed in production, but believe that direct substitution for smoked sheet in an accepted formula is the best procedure for preliminary testing.

The stocks were mixed according to the methods recommended by the A.S.T.M. The stocks were tested for processing characteristics by extruding them on solid copper wire using a small experimental tuber. The smoked sheet and domestic guayule stocks processed nicely, but the Mexican guayule stock was difficult to handle because of its pronounced softness and tackiness.

The stocks were cured in the form of sheets, 6 inches x 6 inches x 0.08 inch, in a hydraulic press. The va-

Note: The opinions or assertions contained herein are the private ones of the authors and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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(5) Morris, James and Werkenthin, "The Compounding of Guayule Rubbers," *I.R.W.*, Vol. 105, No. 6, pp. 565-69 (March, 1942).

TABLE I—RESIN CONTENTS OF RUBBERS BY ACETONE EXTRACTION

Smoked Sheet	2.4%
Domestic Deresinated Guayule Rubber	6.3%
Domestic Resiniferous Guayule Rubber	16.1%
Mexican Resiniferous Guayule Rubber	27.5%

riations in tensile strengths of the stocks with time of cure at 307°F. are plotted in Figure 1.

The 7½ minute cure at 307°F. for each stock was selected for further tests. This cure gave the optimum tensile strength for all stocks except the stock compounded from domestic deresinated guayule rubber. The latter stock was slightly below optimum tensile strength at this curing time, but was judged to be close enough to justify curing it for the same time as the other stocks in order to expedite the tests.

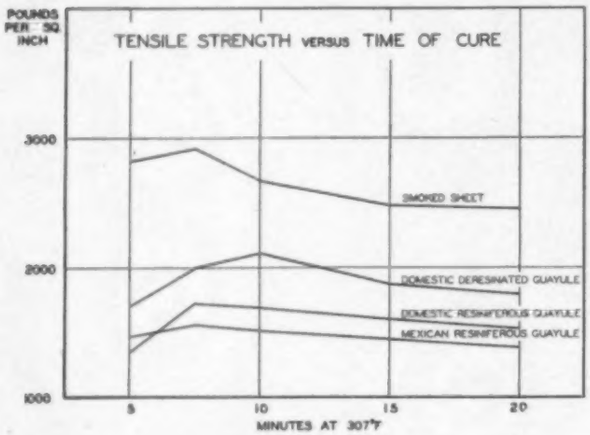


FIGURE 1.

TABLE II—BASIC FORMULA FOR WIRE INSULATION STOCKS

Rubber	100.0
Lithopone	115.0
Zinc Oxide	25.0
Litharge	1.0
Stearic Acid	2.0
Phenyl-alpha-Naphthylamine	2.0
Tetramethylthiuram Monosulfide	0.75
D.O.T.G.	0.25
Sulfur	2.5

Tests for Physical Properties

The stocks were tested for specific gravity, initial tensile properties, permanent set, tear resistance (A. S.T.M. die A), oxygen bomb aging and accelerated light aging. The oxygen bomb aging was carried out for two periods, 48 hours and 96 hours, at 158°F. and under 300 p.s.i. oxygen pressure. The accelerated light aging was performed in the National Eveready Model X-1A Irradiating Unit using unfiltered radiation from the "Sunshine" carbon arc. The specimens were fully exposed at 20% elongation for 40 hours.

The results of the physical tests are given in Table II. The requirements of a government specification *(6)* for 40% rubber insulation are included in the table for contrast. It will be noted that all of the stocks conformed with the requirements of the government specification, although the domestic deresinated guayule stock was on the margin for permanent set and the Mexican resiniferous guayule stock was in a similar position with respect to initial tensile strength. The guayule stocks were considerably weaker in tensile strength and tear resistance than the smoked sheet stock and also differed between themselves in these respects; the domestic deresinated stock was the

(6) Bureau of Engineering and Bureau of Construction and Repair Ad Interim Specification, 15C1 (INT), for Cables, Electric, Insulated (Shipboard Use), dated January 2, 1940.

TABLE III—PHYSICAL PROPERTIES OF WIRE INSULATION STOCKS

	Initial Properties					*Properties After Aging in Oxygen Bomb*				*Properties After Accelerated Light Aging*			
						48 Hours		*96 Hours*					
Type of Rubber	*Specific Gravity*	*Tensile Strength p.s.i.*	*Ultimate Elongation %*	*Permanent Set %*	*Tear Resistance lbs. per inch thickness*	*Tensile Strength p.s.i.*	*Change from Initial %*	*Tensile Strength p.s.i.*	*Change from Initial %*	*Tensile Strength p.s.i.*	*Change from Initial %*	*Ultimate Elongation %*	*Change from Initial %*
Smoked Sheet	1.71	2940	560	8.5	287	2560	—13	2530	—14	1800	—39	450	—20
Domestic Deresinated Guayule	1.76	1940	600	12.5	217	1770	— 9	1690	—13	1020	—47	430	—28
Domestic Resiniferous Guayule	1.78	1710	620	11.0	185	1460	—15	1370	—20	1020	—40	450	—27
Mexican Resiniferous Guayule	1.76	1580	780	8.0	168	1420	—10	1190	—25	420	—73	470	—40
Requirements of Government Specification *(6)*	Min. 1.65	Min. 1500	Min. 450	Max. 12.5	...	Min. 1200	....	Min. 900	....	....	....	...	....

TABLE IV—ELECTRICAL PROPERTIES OF WIRE INSULATION STOCKS

	Smoked Sheet Stock	Domestic Deresinated Guayule Stock	Domestic Resiniferous Guayule Stock	Mexican Resiniferous Guayule Stock
Insulation Resistance—Megohms per centimeter cube	12.1×10^8	7.1×10^8	1.8×10^8	0.35×10^8
Dielectric Strength—breakdown volts through slab-specimen	33300	35800	36300	27700
Power Factor—Percent				
60 c.p.s.	0.60	1.05	1.02	0.82
1000 c.p.s.	0.11	0.62	0.64	0.65
Specific Inductive Capacity				
60 c.p.s.	3.87	4.53	4.63	4.58
1000 c.p.s.	3.69	4.44	4.46	4.44

strongest, followed in order by the domestic resiniferous stock and the Mexican resiniferous stock.

All of the stocks survived the 48-hour oxygen bomb test about equally well, but the 96-hour oxygen bomb test deteriorated the domestic resiniferous stock and the Mexican resiniferous stock to a greater extent than it did the other two stocks. The Mexican resiniferous stock suffered the greatest loss in tensile properties as a result of the accelerated light aging test; the other stocks were affected to approximately the same extent by this test. All of the stocks were severely cracked by the radiation from the carbon arc.

Tests for Electrical Properties

The electrical tests were performed on the slab specimens as follows:

Insulation Resistance—determined by measuring the volume resistivity in accordance with A.S.T.M. Method D257-38. Lead foil electrodes were used.

Dielectric Strength—tests conducted on 6 inch x 2 inch specimens of the slab insulating materials in accordance with A.S.T.M. Method D119-38, Paragraph 19. The electrodes were ¼ inch x ¼ inch x 4 inch brass bars.

Power Factor—determined on slabs in accordance with A.S.T.M. Method D150-36T. Tests at 1000 cycles per second were made using circular plate electrodes and a guard ring. Tests at 60 cycles per second were made using circular plate electrodes and no guard ring.

Specific Inductive Capacity—determined in accordance with A.S.T.M. Method D150-36T using circular plate electrodes. Tests at 1000 cycles per second were made using a guard ring, while tests at 60 cycles per second were made without the guard ring. The edge correction factor was used in computing the results of the latter determinations.

The results of the electrical tests are given in Table III. The results indicate that the guayule stocks have fair D. C. electrical properties and good A. C. electrical properties. Insulation resistance is apparently proportional to the resin content of the rubber, but the other properties do not show this relation.

CONCLUSIONS

The authors consider the domestic guayule rubbers to have definite possibilities as substitutes for Hevea rubber in wire insulation. The Mexican resiniferous guayule rubber is not as satisfactory for this purpose because of its pronounced softness and tackiness and the poorer physical properties exhibited by its stocks. On the basis of the scant information available in the literature *(7, 8)*, the authors conclude that the guayule rubbers probably approach the electrical properties of Hevea rubber closer than any of the current vulcanizable synthetic rubbers with the exception of Butyl Rubber *(9, 10)*.

(7) Wood, "Synthetic Rubbers: A Review of their Compositions, Properties, and Uses," *Rub. Chem. & Tech.*, Vol. 13, No. 4, pp. 861-85 (October, 1940).
(8) Roelig, "Buna in the Manufacture of Cables," *Ibid*, Vol. 13, No. 4, pp. 948-61 (October, 1940).
(9) Thomas, Lightbown, Sparks, Frolich and Murphree, "Butyl Rubber," *Ibid*, Vol. 14, No. 1, pp. 177-95 (January, 1941).
(10) Unpublished work of the authors.

Specific Heat of Hycar O. R.

KNOWLEDGE of the basic thermodynamic constants of two substances permits a calculation of the equilibrium constant in chemical reactions involving the formation of one from the other. Previous work of this sort has been carried out at the National Bureau of Standards at Washington, D. C., to obtain information about the polymerization reaction of isoprene to form rubber, and its reverse, the decomposition of rubber to give isoprene.

Similar data concerning synthetic rubber has recently become of increased importance and the first measurements necessary for evaluating the thermodynamic constants of Hycar O. R. have been reported by the Bureau. The specific heat of Hycar O. R. has been measured or evaluated from the absolute zero of temperature to about 70° C. The specific heat at 25° C. was found to be 1.971 international joules/degree gram. It was not found possible to crystallize or melt the material, but a second-order transition, one which involves no appreciable absorption or evolution of heat, was found at about —23° C. A similar transition in natural rubber occurs at about —70°. It would appear that below the temperature of its second-order transition a material is brittle and relatively inextensible.

The increase in entropy resulting from heating from the absolute zero of temperature to 25° C. was calculated from the specific heat data to be 1.743 international joules/degree gram.

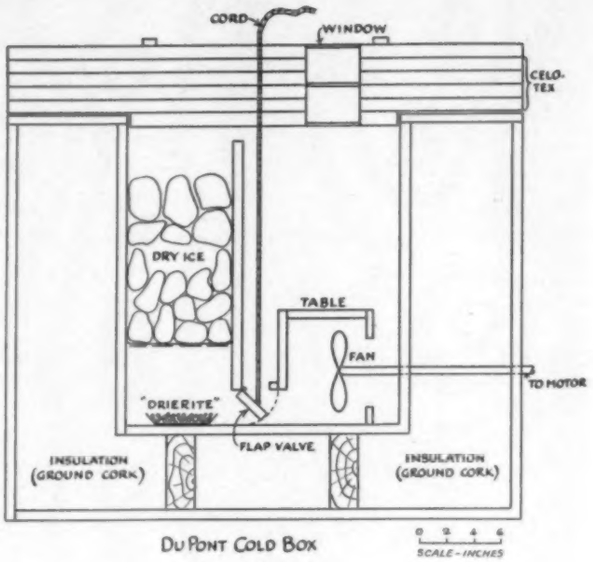
Method of Recording Changes in Hardness of Rubber

ONE accepted method of evaluating the performance of vulcanized rubber or synthetic rubber at low temperatures has been to apply the T-50 test. While this method has given results which are significant with respect to the state of cure, it has not been applicable for determining other physical changes which must be known in evaluating the performance of these materials at low temperatures. Changes in hardness greatly affect the performance of rubber and synthetic rubber articles and, in order to evaluate these changes, a new test method has been developed in the DuPont Rubber Laboratories.

The object of the new test method is to record the changes in hardness of vulcanized rubber and synthetic rubber during exposure to low temperatures. The apparatus includes a cold box (illustrated herewith), which is capable of accurate temperature control. The atmosphere in the box is cooled by circulating it through a bed of dry ice and the rate of cooling is controlled by varying the circulation of the atmosphere. A 60-watt electric light bulb is located in the box and used as a source of heat to modify temperatures, if necessary. The air is passed over a desiccant to prevent the formation of ice crystals at low temperature.

Cylindrical pellets of vulcanized rubber or synthetic rubber 0.5 inch high by 0.75 inch in diameter are mounted on the circumference of a wheel which lies in a horizontal position in the cold box. The wheel may be rotated by means of a shaft running through the top of the box. A Shore durometer is mounted in the horizontal position adjacent to the circumference of the wheel at a point where it may be read through a glass window in the top of the cold box. The test specimens are placed in position with respect to the durometer by rotating the wheel, and the durometer is brought into contact with the test specimens under a total force of two pounds pressure when the tension on a cord running to the exterior of the box is released.

In tests conducted by the DuPont Rubber Laboratories, the following time cycles were arbitrarily chosen:



DUPONT COLD BOX

Temperature Reading	*Hardness After*
82° F.	0 minutes
20° F.	15 minutes
0° F.	15 minutes
—10° F.	15 minutes
—20° F.	15 minutes
—30° F.	15 minutes
—40° F.	20 minutes
—50° F.	25 minutes
—60° F.	30 minutes
—70° F.	35 minutes
—80° F.	60 minutes

The temperature control of the cold box is such that the temperature may be lowered very rapidly. If the time interval at which the test specimens are subjected to the different temperatures is varied, this will affect the T-50 value because time is a factor in the hardening of vulcanizers.

Potential Insect Enemies of Guayule

THERE are more than twenty different types of insects which are potential enemies of guayule, according to a list recently compiled by the U. S. Department of Agriculture. Entomologists are now studying ways to protect this important rubber-bearing plant if insect attacks should develop. Biggest potential insect threat is a small bark beetle that has been reported attacking stacked guayule in Mexico. This beetle is able to breed in the dry material for more than a year, and could damage stored guayule awaiting conversion to rubber.

Entomologists are suggesting prompt utilization of guayule after harvest to prevent beetle attacks in the cut material. However, these beetles are not known to be present in the United States, so special quarantine measures may be helpful in preventing introduction of the beetle into this country from Mexico in cut and dried guayule plants.

Many other types of insects that attack plants similar to guayule are under close study by the Federal entomologists, who point out that some of these may transfer their attentions to guayule as the acreage of this plant is expanded in the United States. These insects include: Several species of white grubs that may cause damage to guayule roots, especially in nurseries; dryland species of wire-worms and millipeds that also attack roots of certain farm crops and weeds; leaf-eating caterpillars, beetles, and grasshoppers; sap-sucking aphids, leafhoppers, mealybugs, mites, and scale insects; and various maggots and caterpillars that thrive on pollen, nectar, and the inner parts of the flowering head.

A Study of Carbon Blacks in Natural and in Various Synthetic Rubbers

BY DR. I. DROGIN

Director of Research, United Carbon Co., Inc., Charleston, West Virginia

THE following is a review of a study of carbon blacks in synthetics presented to technical representatives of many rubber companies at two conferences sponsored by the United Carbon Co., Inc., at Charleston, West Virginia, in July, 1942. The study first deals with a comparison of several types of synthetics and smoked sheet in a pure gum compound. The synthetics studied were Buna S from five different sources, Buna N from two different sources, Thiokol RD, Thiokol N and Neoprene GN.

The compounds were formulated as follows for the different rubbers: Smoked Sheet or Buna S or Buna N (100), Zinc Oxide (5), Stearic Acid (1), Altax (1), Sulfur (2); Butyl B (100), Zinc Oxide (5), Stearic Acid (3), Tuads (1), Sulfur (1.5); Thiokol N (100), Zinc Oxide (10), Stearic Acid (0.5), Altax (0.35), DPG (1); Thiokol RD (100), Zinc Oxide (5), Stearic Acid (1), Altax (1), Sulfur (1); Neoprene GN (100), Zinc Oxide (5), Stearic Acid (0.5), Calcined Magnesia (4). The Thiokol N was press cured at 287° F; the smoked sheet, Buna S, Buna N, Thiokol RD and Neoprene GN gum compounds at 292° F.; and the Butyl B at 307° F.

The results show that in comparison with smoked sheet the synthetics are less plastic, more difficult to process, and are tougher. They have lower tensile strength and lower tear resistance, lower rebound and higher heat build up. Buna N, Thiokol RD and Neoprene GN are higher in modulus. All the other synthetics are comparable. Some Buna S synthetics and Thiokol N are comparable with smoked sheet in hardness. Other Buna S synthetics and Butyl B are lower; Buna N, Thiokol RD and Neoprene GN are higher.

Buna S rubbers process easier than Buna N rubbers and they show lower stress-strain, lower hardness and higher rebound. Butyl B processes easier than the Buna rubbers. It gives lower modulus but much higher tensiles and elongation at break. Butyl B is softer and has very low rebound at room temperature. Neoprene GN is harder to process than the Buna rubbers. It is higher in stress-strain and elongation at break. It is harder and has higher tear resistance and rebound. Thiokol RD is harder to process than the Buna rubbers and Neoprene GN; in other characteristics it rates between Buna N and Neoprene GN. Thiokol N is much easier processing but its extruded stock is rough looking. It is poorer reinforcing than Thiokol RD and is also malodorous. Graphs of the extrusion and stress-strain values of the different rubbers are shown in Chart 1.

The rating of synthetic rubbers against natural rubber is shown in Table 1. Natural rubber, for purpose of comparison, has been assigned the value of 100.

Having established a comparison between different synthetics and natural rubber in a pure gum compound, the study next undertakes to compare the effect of increased loadings (0-60 parts by weight on 100 of rubber) of channel process black, Kosmobile 77/Dixiedensed 77, in natural rubber, Buna S, Buna N and Butyl B. The base compound for each rubber was as follows: Smoked Sheet (100), Zinc Oxide (5), Stearic Acid (4), Pine Tar (3), Altax (1), Sulfur (2.85); Buna S or Buna N (100), Zinc Oxide (5), Stearic Acid (1), Pine Tar (3), Paraflux (3), Altax (1.25), Sulfur (2); Butyl B (100), Zinc Oxide (5), Stearic Acid (3), Tuads (1), Sulfur (1.5). The smoked sheet, Buna S and Buna N compounds were cured at 292° F.; Butyl B at 307° F.

The results indicate that carbon black has considerable effect on Buna S, followed by Buna N, natural rubber and Butyl B in the order named. The effect on tensile strength and hardness is summarized in Table 2 where the figures represent per cent increase from the base compound which contains no carbon black.

Graphs of the stress-strain values for the rubbers studied are shown in Chart 2. The ultimate tensile strength of natural rubber is better than that of synthetic rubbers. Butyl B rates next, followed by Buna N, with Buna S rating fourth. Buna N shows the highest modulus, with natural rubber rating second, followed by Buna S and Butyl B.

One thing stands out, namely, that whereas the maximum tensile in natural rubber is attained by a loading of close to 40 parts by weight of carbon black

TABLE 1—RATING OF SYNTHETIC RUBBER AGAINST NATURAL RUBBER IN A PURE GUM COMPOUND.

	Tensile	Elongation	Hardness	Tear[1]	Rebound[2]
Smoked Sheet	100	100	100	100	100
Buna S					
Buna S (Naug.)	15	74	74	17	74
Buton S	13	55	89	15	78
Chemigum IV	21	78	100	37	85
Hycar TT	11	52	100	9	81
Buna N					
Perbunan	25	67	129	30	81
Hycar OR	40	73	129	35	37
Butyl B	90	98	86	17	22
Thiokol					
RD	56	56	143	34	—
N	9	85	100	11	78
Neoprene GN	84	79	143	49	91

(1) Winkelmann Tear Test; crescent shaped piece. (2) Lupke type machine.

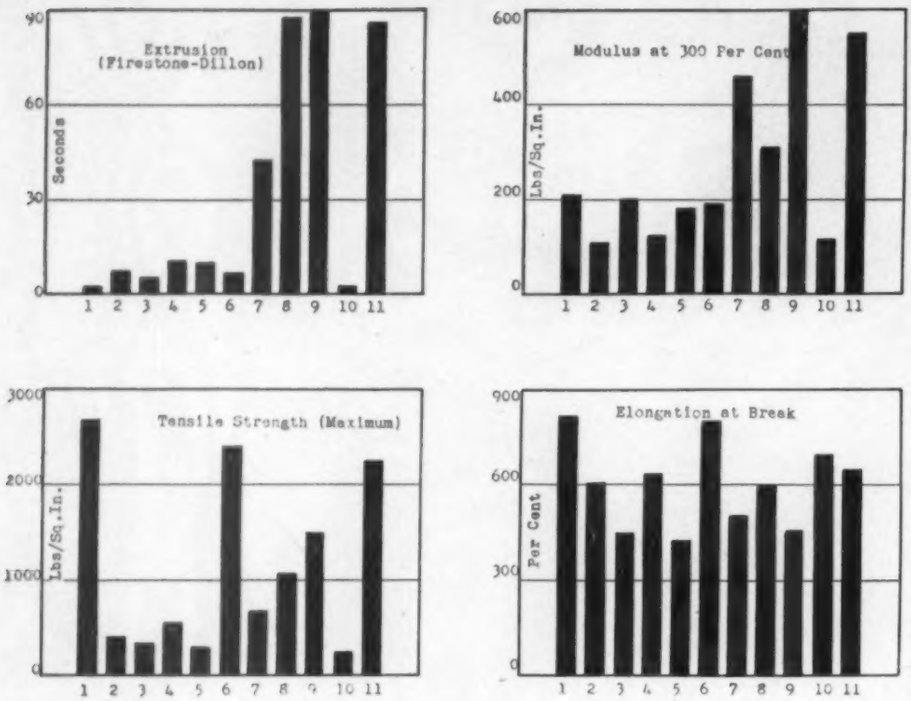


CHART I

NATURAL VERSUS SYNTHETIC RUBBER IN A PURE GUM COMPOUND.

1. Smoked Sheet
2. Buna S (Naug.)
3. Buton S
4. Chemigum IV
5. Hycar TT
6. Butyl B
7. Perbunan
8. Hycar OR
9. Thiokol RD
10. Thiokol N
11. Neoprene GN

on 100 of rubber, the tensile strength peak in Buna S and Buna N is not attained until at least 50 parts by weight of the same black have been added. The tensile strength of Butyl B does not appear to be influenced by the carbon black loading.

The next part of the study deals with the effect of a fixed loading (50 parts by weight) of channel process black, Kosmobile 77/Dixiedensed 77, in natural rubber and in ten synthetic rubbers including Buna S, Buna N, Butyl B, Thiokol RD, Thiokol N and Neoprene GN. The base compound for each rubber was as follows: Smoked Sheet (100), Zinc Oxide (5), Stearic Acid (3.5), Altax (1), Pine Tar (3), Sulfur (2.85); Buna S or Buna N (100), Zinc Oxide (5), Stearic Acid (1.5), Altax (1.25), Pine Tar (3), Paraflux (3), Sulfur (2); Butyl B (100), Zinc Oxide (5), Stearic Acid (3), Tuads (1), Sulfur (1.5); Thiokol N (100), Zinc Oxide (10), Stearic Acid (0.5), Altax (1.35), DPG (0.1); Thiokol RD (100), Zinc Oxide (5), Stearic Acid (1), Sulfur (1); Neoprene GN (100), Zinc Oxide (5), Stearic Acid (0.5), Calcined Magnesia (4). Fifty parts of the black by weight on 100 of rubber were added to each base compound. The smoked sheet, Buna S, Buna N, Thiokol D and Neoprene GN compounds were cured at 292° F.; Thiokol N at 287° F. and Butyl B at 307° F.

TABLE 2—PER CENT INCREASE IN TENSILE STRENGTH AND HARDNESS OF NATURAL AND SYNTHETIC RUBBERS, COMPOUNDED WITH 10-60 PARTS OF CHANNEL PROCESS CARBON BLACK. (THE FIGURES REPRESENT PER CENT INCREASE FROM THE BASE COMPOUND WHICH CONTAINS NO CARBON BLACK.)

Tensile Strength—Per Cent Increase

Loadings	10	20	30	40	50	60
Smoked Sheet	23	38	56	51	39	34
Buton S	190	450	810	1150	1240	1100
Perbunan	92	183	233	285	405	405
Butyl B	7	8	7	11	4	—4

Shore Hardness—Per Cent Increase

Loadings	10	20	30	40	50	60
Smoked Sheet	10	22	34	49	61	81
Buton S	11	36	50	67	80	97
Perbunan	17	30	41	50	57	72
Butyl B	17	33	50	67	83	83

The results show that the synthetic rubbers process harder than the natural rubber. Buna S and Butyl B process easier than Buna N, Thiokols and Neoprene GN. From the standpoint of reinforcement, Neoprene GN, Thiokol RD and Buna N have higher modulus, higher hardness, and better resistance to abrasion than natural rubber. However, the tensile strength and the rebound of natural rubber is higher than any of the synthetic rubbers. Buna N, Thiokols and Neoprene GN have a lower elongation at break than smoked sheet. All the synthetic rubbers have much higher heat build up than the smoked sheet. Neoprene GN shows the lowest heat build up of the synthetic rubbers. Chart 3 shows graphs of the extrusion, modulus, tensile and rebound values of the different rubbers.

The rating of the synthetic rubbers against natural rubber is shown in Table 3. Natural rubber for purpose of comparison has been assigned the value of 100.

The next part of the study deals with the effect of a fixed loading (60 parts by weight) of semi-reinforcing black, Kosmos 20/Dixie 20, in natural rubber and in seven synthetic rubbers comprising Buna S, Buna N and Butyl B. The base compound for each rubber was as follows: Smoked Sheet (100), Zinc Oxide (5), Stearic Acid (2), Altax (0.65), Sulfur (2.85); Buna S or Buna N (100), Zinc Oxide (5), Stearic Acid (1.5), Pine Tar (1.5), Paraflux (1.5), Altax (1.25), Sulfur (2); Butyl B (100), Zinc Oxide (5), Stearic Acid (3), Tuads (1), Sulfur (1.5). Sixty parts of the black on 100 of rubber were added to each

TABLE 3—RATING OF SYNTHETIC RUBBERS AGAINST NATURAL RUBBER IN A COMPOUND REINFORCED WITH 50 PARTS BY WEIGHT OF CHANNEL PROCESS CARBON BLACK ON 100 PARTS OF RUBBER.

	Plasticity (1)	Extrusion (2)	Modulus	Tensile	Elongation	Hardness (3)	Tear (4)	Abrasion (5)	Rebound (6)	Heat Build Up (7)
Smoked Sheet	100	100	100	100	100	100	100	100	100	100
Buna S										
Buna S (Naug.)..	80	36	59	74	121	94	33	87	88	+59°F.
Buton S	66	39	55	64	110	94	40	73	77	+67°F.
Chemigum IV	58	16	83	73	102	97	27	151	90	+44°F.
Hycar TT	86	32	62	74	120	94	27	115	90	+58°F.
Buna N										
Perbunan	34	19	114	88	74	109	24	1055	83	+44°F.
Hycar OR	60	9	159	99	80	117	28	5950	38	+46°F.
Butyl B	58	34	31	69	143	86	61	51	25	+70°F.
Thiokol										
RD	34	8	152	72	67	125	28	1350	31	+47°F.
N	24	6	60	24	58	109	19	92	52	+50°F.
Neoprene GN	24	4	238	86	54	125	39	578	94	+28°F.

(1) Williams Plastometer at 70° C. (2) Firestone-Dillon Plastometer. (3) Shore. (4) Winkelmann tear test, crescent-shaped piece. (5) Grasselli Abrader. (6) Lupke-type machine. (7) Goodrich Flexometer, average of 30 min. cycle.

base. The smoked sheet, Buna S and Buna N compounds were cured at 292° F.; Butyl B compound at 307° F.

The results show that natural rubber is better processing than synthetic rubber when compounded with semi-reinforcing black. Buna N is harder processing than Buna S; Buna N shows higher stress-strain than natural rubber, which in turn is better reinforced than Buna S. The synthetic rubbers are lower in rebound and also show considerably higher heat build up. Butyl B is better processing than the Bunas and its reinforcement is lower than that of the Bunas. It differs considerably from natural rubber. Its rebound is quite low and it has high heat build up. Chart 4 shows graphs of the extrusion, tensile strength, tear resistance and rebound values for the different rubbers.

The rating of the synthetic rubbers against natural rubber is shown in Table 4. Natural rubber for purpose of comparison has been assigned the value of 100.

The next point in the study deals with a comparison of six different types of black in a fixed loading (50 parts by weight) in natural rubber, Buna S, Buna N and Butyl B. The base compound for each rubber was as follows: Smoked Sheet (100), Zinc Oxide (5), Stearic Acid (4), Pine Tar (3), Altax (1), Sulfur (2.85); Buna S or Buna N (100), Zinc Oxide (5), Stearic Acid (1), Pine Tar (3), Paraflux (3), Altax (1.25), Sulfur (2); Butyl B (100), Zinc Oxide (5), Stearic Acid (3), Tuads (1), Sulfur (1.5). Fifty parts of black by weight on 100 of rubber were added to each base compound. The smoked sheet, Buna S and Buna N compounds were cured at 292° F.; the Butyl B at 307° F.

The blacks studied represented reinforcing, semi-

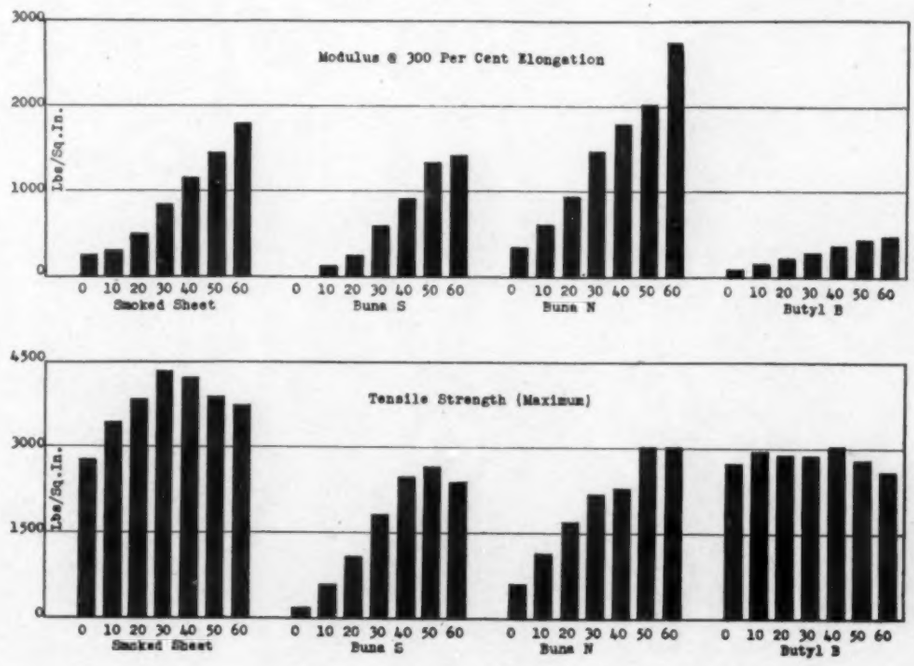


CHART II

INCREASED LOADING OF CARBON BLACK IN NATURAL AND SYNTHETIC RUBBERS.

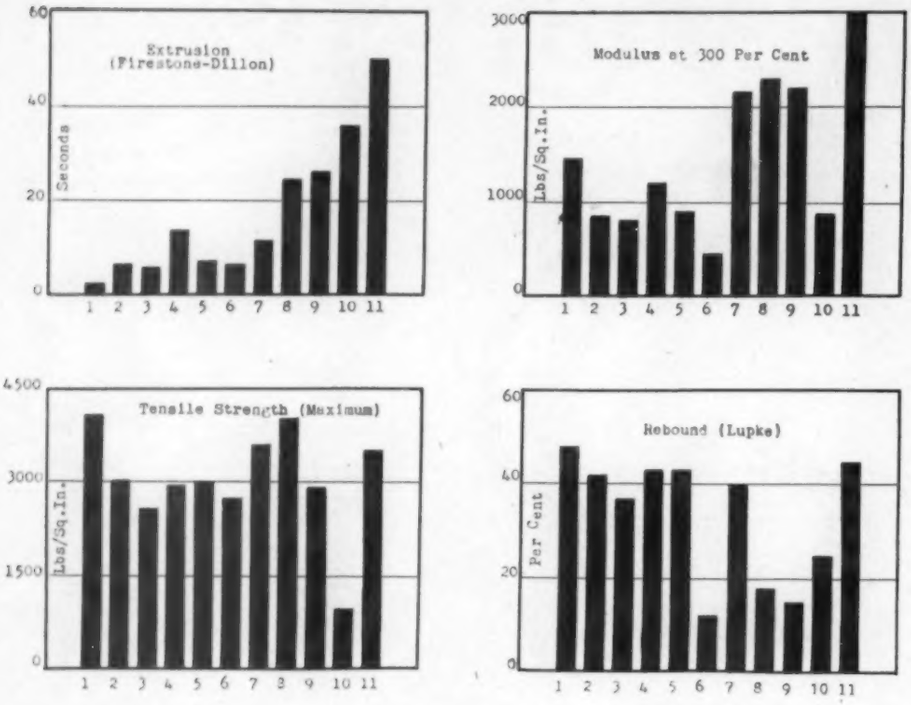


CHART III

EFFECT OF KOSMOBILE 77 BLACK IN NATURAL AND SYNTHETIC RUBBERS.

1. Smoked Sheet
2. Buna S (Naug.)
3. Buton S
4. Chemigum IV
5. Hycar TT
6. Butyl B
7. Perbunan
8. Hycar OR
9. Thiokol RD
10. Thiokol N
11. Neoprene GN

reinforcing and "soft" types made by different processes. These blacks differed in physical and chemical characteristics. As expected, they behaved differently in natural rubber. The results show that they likewise produced different results in the synthetic rubbers, following the same trend as in natural rubber. The difference between reinforcing and lesser reinforcing black is quite noticeable in Buna S, especially in rate of extrusion.

Differences in tensile strength for the six blacks were sharply defined in Buna S and Buna N. Butyl B showed the widest difference in tear resistance and the minimum difference in rebound. The heat build up varied for the six blacks, showing minimum values

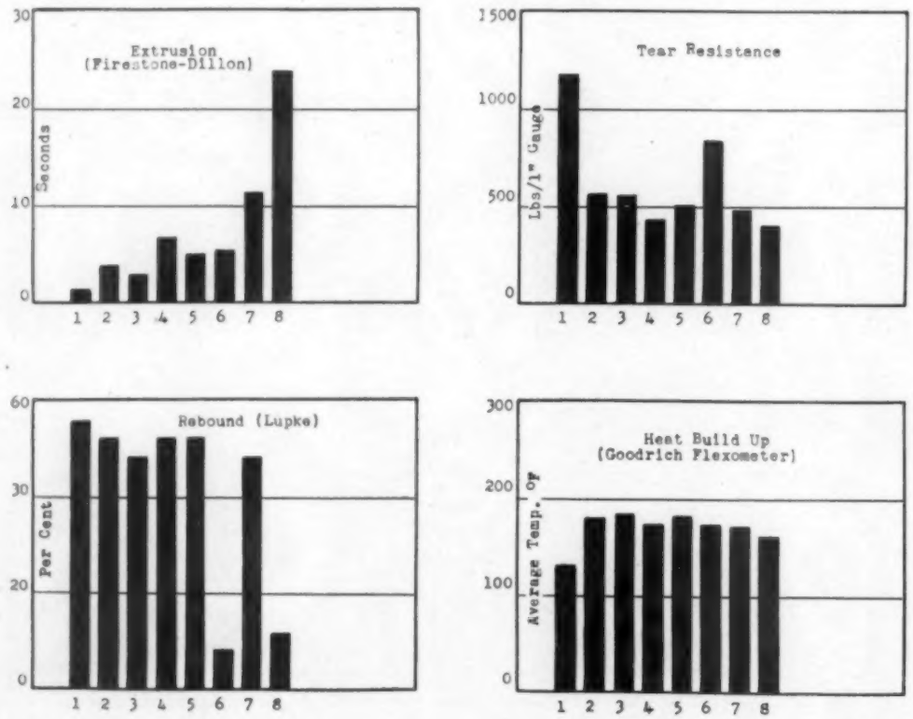


CHART IV

EFFECT OF SEMI-REINFORCING BLACK IN NATURAL AND SYNTHETIC RUBBERS.

1. Smoked Sheet
2. Buna S (Naug.)
3. Buton S
4. Chemigum IV
5. Hycar OS-30
6. Butyl B
7. Perbunan
8. Hycar OR

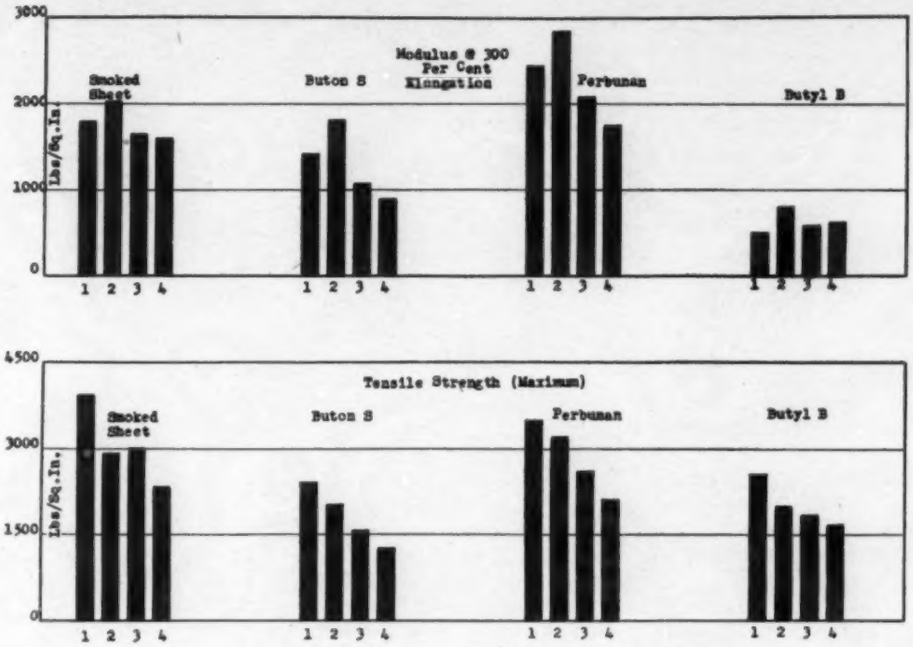


CHART V

EFFECT OF LAMP BLACK AND ACETYLENE BLACK IN NATURAL AND SYNTHETIC RUBBERS.

1. Kosmobile 77
2. Acetylene Black
3. Kosmos 20
4. Lamp Black

for the "soft" types in Butyl B and Buna N.

The next part of the study is devoted to a comparison of the reinforcement of natural and synthetic rubbers where the effect of loadings of 45-60 parts by weight of channel process black is compared with the effect of loadings of 55-85 parts by weight of furnace type blacks. The results show that synthetic rubbers and natural rubber react somewhat differently toward increased loadings of the various blacks. The processing of Butyl B appears to be least affected. That of Buna S appears to be strongly influenced by reinforcing black. Buna S extrudes most easily, followed by Butyl B, natural rubber and Buna N in the order named. Higher loadings of channel process black produce higher heat build up in natural rubber and Butyl B, but lower heat build up in Buna S and Buna N. Higher loadings of semi-reinforcing and "soft" types of black produce only slightly higher heat build up in all the rubbers.

It is evident that high loadings (60-85 parts, by weight) of semi-reinforcing and "soft" blacks, fail to match the reinforcement of channel process black at 50 parts loading. The "softer" the black, the lower the reinforcement. However, the heat build up of the semi-reinforcing and "soft" blacks at the high loadings is less than that of the channel process black at the 50 parts loading. There are also indications that a type of black made by a special thermal decomposition process will, at 70 parts loading, match the reinforcement of channel process black at 50 parts loading, when used in Buna S.

Another part of the study deals with a comparison of lamp black, acetylene black, semi-reinforcing black, and channel process black at 60 part loadings, in natural and in synthetic rubbers. The base compound for the different rubbers was as follows: Smoked Sheet (100), Zinc Oxide (5), Stearic Acid (2), Altax (0.65), Sulfur (2.85); Buna S or Buna N (100), Zinc Oxide (5), Stearic Acid (1.5), Pine Tar (1.5), Paraflux (1.5), Altax (1.25), Sulfur (2); Butyl B

TABLE 4—RATING OF SYNTHETIC RUBBERS AGAINST NATURAL RUBBER IN A COMPOUND LOADED WITH 60 PARTS BY WEIGHT OF SEMI-REINFORCING BLACK ON 100 PARTS OF RUBBER.

	Plasticity (1)	Extrusion (2)	Modulus	Tensile	Elongation	Hardness (3)	Tear (4)	Abrasion (5)	Rebound (6)	Heat Build Up (7)
Smoked Sheet	100	100	100	100	100	100	100	100	100	100
Buna S										
Buna S (Naug.) ..	48	33	63	80	124	94	48	87	91	+49°F.
Buton S	44	45	66	56	116	92	47	78	79	+53°F.
Chemigum IV	34	19	92	78	95	100	37	105	91	+42°F.
Hycar OS-30	42	25	60	78	122	92	43	85	91	+51°F.
Buna N										
Perbunan	34	11	139	104	75	708	41	1030	81	+41°F.
Hycar OR	36	5	180	100	62	115	34	4380	32	+31°F.
Butyl B	70	23	34	65	157	85	71	80	23	+42°F.

(1) Williams Plastometer at 70°C. (2) Firestone-Dillon Plastometer. (3) Shore. (4) Winkelmann tear test, crescent-shaped piece. (5) Grasselli Abrader. (6) Lupke-type machine. (7) Goodrich Flexometer, average of 30 min. cycle.

(100), Zinc Oxide (5), Stearic Acid (3), Tuads (1), Sulfur (1.5). Sixty parts of black on 100 of rubber were added to each base compound. The smoked sheet, Buna S and Buna N were cured at 292° F. and the Butyl B at 307° F.

The results indicate that lamp black has apparently the same effect in rubber as the semi-reinforcing black, Kosmos 20, whereas acetylene black rates in several respects between Kosmos 20 and the channel process black, Kosmobile 77. Acetylene black has higher heat build up than Kosmobile 77 when used in natural rubber, Buna S and Buna N. The electrical conductance of acetylene black is outstandingly good. Chart 5 shows graphs of the modulus and tensile strength of the four blacks in the rubbers studied.

Another part of the study deals with a comparison of three types of black in a practical tread compound made with Buna S. The blacks studied represented channel process black (50 parts loading), a semi-reinforcing black (60 parts loading), and a black made by a special thermal decomposition process (55 parts loading). The results show that the special thermal decomposition black gave the best results as to ease of processing, stronger reinforcement, less abrasion loss, better flex resistance, higher resiliency and lower heat build up. The semi-reinforcing black, in spite of its high loading, rated third due to low reinforcement.

Another part of the study deals with the effect of channel process black in a blend of 80 parts of synthetic rubber with either 20 parts of smoked sheet or 20 parts of whole tire reclaim. This study was undertaken with Buna S, Buna N and Butyl B, but it was soon found that the blend of Butyl B with either smoked sheet or reclaim gave an unsatisfactory vulcanizate, due to lack of affinity between the rubbers.

The results for Buna S and Buna N were as follows: Blending 80 parts of Buna S with 20 parts of smoked sheet or reclaim improves the processibility, the modulus and the resistance to abrasion. It lowers the elongation at break and the heat build up. It has no effect on rebound. Blending 80 parts of Buna N with 20 parts of smoked sheet or reclaim retards processibility and lowers somewhat the stress-strain. The heat build up in case of the reclaim blend is also lowered somewhat. The elongation at break in the blend with natural rubber is increased.

To sum up, the results of this study show that synthetic rubbers are quite different from natural rubber. Synthetic rubbers are tougher and less plastic. They do not have the tensile strength of natural rubber. They are frequently harder, but this is not a true measure of their strength. They are less resilient than natural rubber. They heat up more. Synthetic rubbers also differ from each other. For instance, Buna N and Neoprene GN are much harder processing than Buna S. Butyl B is somewhat better processing than Buna S. Butyl B and Neoprene GN have the highest tensile strength. Buna N is higher in tensile strength than Buna S. Thiokol N has the lowest tensile strength whereas Thiokol RD rates between Buna S and Buna N. Butyl B is particularly low in resiliency.

It is apparent that without the benefit of reinforcement of carbon black, synthetic rubbers give very poor results. The effect of carbon black is most pronounced in Buna S, and less pronounced in Butyl B. The tensile strength of Buna S is materially improved, but at best it does not equal that of natural rubber. It attains its maximum tensile strength when loaded with approximately 25% more black than that required by natural rubber. While carbon black influences the behavior of synthetic rubber there still remain the inherent differences among the various types of synthetics. Some of the harder processing synthetics, such as Buna N and Neoprene GN, continue to show better reinforcement than the easier processing synthetics, Buna S and Butyl B.

The various types of black show properties in synthetic rubber comparable with those shown in natural rubber. Difficulties encountered with synthetic rubber in processing, heat build up and resiliency can be minimized by careful selection of black. It is obvious that synthetic rubbers, even more than natural rubber, require the use of carefully selected blacks to produce best results.

The Beta-Anomaly in Rubber

WHEN Ruhemann and Simon measured the specific heat of rubber in 1928, they found three anomalies which they called the α, β, and γ. The existence of the α-anomaly, near —70° C., has been confirmed by the later investigators. The γ-anomaly, found at temperatures between 15° and 30° C., was present only in rubber which could be shown by other means to be at least partially crystallized, and was said to be due to the melting of the crystals. There has been no question as to the correctness of this explanation.

The β-anomaly, however, which Ruhemann and Simon found near 0° C., has never been satisfactorily explained. Other observers have not been able to find irregularities in the specific heat or other properties of rubber in this region. Consequently, the existence and nature of the β-anomaly have remained in doubt.

In a recent letter to the editor of the *Journal of Chemical Physics*, Lawrence A. Wood, of the Rubber Section of the National Bureau of Standards, points out that the results of Ruhemann and Simon can now be explained as a phenomenon of crystallization without the assumption of an anomaly characteristic of rubber in general.

Recent work at the Bureau has shown that the melting range of crystalline rubber is dependent on the temperature at which crystallization has taken place. Crystallization is most rapid near —20° C., and it is probable that the experimental conditions of Ruhemann and Simon were such that the rubber was at a temperature near —20° C. for a sufficiently long period for crystallization to occur during their experiments. Rubber crystallized at such a temperature would be expected to melt near 0° C. and to give rise to a peak in the specific heat curve like the one which Ruhemann and Simon named the β-anomaly.

The conclusion may then be drawn that the anomaly found near 0° C. by Ruhemann and Simon represented merely the melting of crystals formed under the particular conditions of their experiments, and that this anomaly is not characteristic of rubber in general.

Rubber Division, A. C. S., Holds Successful Meeting In Buffalo

THE meeting of the Rubber Division, A.C.S., held in Buffalo N. Y., on September 10 and 11, in conjunction with the 104th Meeting of the parent society, was one of the largest and most successful held to date. Approximately 625 members and guests attended the four technical sessions, all held in the ballroom of the Hotel Lafayette, headquarters for the Division, while the attendance at the banquet totalled 619. Twenty-nine papers were given during the technical sessions, including a number which comprised a Symposium on the Compounding and Properties of Synthetic Rubber. These were given at the sessions held on Friday, September 11.

Few Papers Actually Withdrawn

In opening the meeting, John N. Street (Firestone), Chairman of the Division, announced that because of restrictions laid down by official Washington it would not be possible for some of the speakers to answer questions which might arise during the discussion periods. Few questions, however, arose which fell into this category. Only one of the 30 papers originally scheduled was withdrawn because of censorship requirements, that being the paper on an "Improved Method of Reclaiming Rubber" by John M. Bierer and Walter W. Evans of the Boston Woven Hose & Rubber Co. A discussion on the compounding of butadiene-styrene copolymers, which was to have been held at the technical session on Friday morning in connection with the special symposium, was also called off because of time limits. Abstracts of all of the papers, except those withheld by the censors, appeared in the August, 1942, issue of RUBBER AGE.

A keen disappointment was the announcement that Dr. L. B. Sebrell, Manager of the Research Department of the Goodyear Tire & Rubber Co., Akron, the 1942 Goodyear Lecturer, was unable to give his planned "lecture" at the meeting. Dr. Sebrell had prepared a paper on synthetic rubber and in view of the pending Baruch Committee report considered it advisable to withdraw it. The "lecture," however, will be given at the next meeting of the Division. Dr. David Spence, noted rubber technologist, now serving with the Rubber Reserve Co., the first Goodyear Lecturer selected last year, was unable to give his address because of illness at the time.

Although a full symposium on synthetic rubber had been announced for the General Meeting of the Society, held at Memorial Auditorium on Wednesday, September 9, only two of the four planned papers were given. The talk on "Progress of Synthetic Rubber Production," which was to have been given by Dr. E. R. Weidlein, of the Mellon Institute of Industrial Research and technical consultant on synthetic rubber to the Rubber Reserve Co., was withdrawn at the suggestion of Dr. Weidlein who, according to H. N. Holmes, president of the Society, felt that it was an inauspicious time to give the talk in view of the pending report from the Baruch Committee. A paper on "The Outlook on the Rubber Situation," which was to have been given by an unannounced prominent rubber official, was also withdrawn, presumably for the same reason.

The scheduled papers on "Progress of Butadiene Production," by Albert L. Elder of the War Production Board, and "Progress of Styrene Production," by Dr. Willard Dow, president of the Dow Chemical Co., were presented. Both speakers were introduced by President Holmes.

Mr. Elder went fully into the history and production of butadiene from both the carbon-hydrogen and carbon-hydrogen-oxygen compounds. He stated that the butadiene program fixed by WPB called for the production of 717,800 tons by November of next year, with the first plant to be placed in operation this month with a capacity of 13,300 tons per year and the last scheduled for completion next October with a capacity of 50,000 tons. New plants in the overall program will be coming into existence almost every month until full capacity has been attained.

The WPB representative explained in detail how the government decided upon its present butadiene program. He said it was natural for the petroleum and rubber fields to play a dominant role in the production of the basic raw material for synthetic rubber since the existence of both industries depends on synthetic rubber supplies. He also stated it was practically impossible to arrive at accurate plant costs since no large scale production of butadiene from any raw material—petroleum or alcohol—had ever been attempted before. In closing his address, Mr. Elder expressed complete confidence in the ability of American chemists to meet the full synthetic rubber program.

The second speaker, Dr. Dow, traced the commercial development of styrene, stating that the literature on the production of this material was voluminous, extending back more than 100 years, on both monomers and polymers. He outlined the difficulties encountered by Dow Chemists before reaching the present stage of development and compared the Dow method of making ethyl benzene with others. An interesting remark made by Dr. Dow in his address was the statement that in the present method of producing styrene fully 80% of the catalyst is recovered.

Officers for 1942-43 Season

The new officers of the Division, selected by letter ballot, were announced at the Business Meeting, held on Friday afternoon. These are: *Chairman,* John T. Blake (Simplex Wire & Cable); *Vice-Chairman,* Harold Gray (Goodrich); *Sergeant-at-Arms,* M. J. De-

France (Goodyear); *Secretary*, H. I. Cramer (Sharples Chemicals); *Treasurer*, C. W. Christensen (Monsanto); *Directors*, A. W. Carpenter (Goodrich), S. M. Cadwell (U. S. Rubber), J. M. Ball (Vanderbilt; now serving with the Rubber Branch, WPB), W. W. Vogt (Goodyear). In addition to these officers, John Street (Firestone), the retiring chairman, automatically becomes an ex officio director, while C. C. Davis (Boston Woven Hose) and Seward G. Byam (DuPont) continue to act as ex officio directors as editor and advertising manager, respectively, of *Rubber Chemistry & Technology*.

The membership of the Division has now reached 974, according to a report made at the meeting by Charles R. Haynes (Binney & Smith) in his capacity as chairman of the Membership Committee. This represents an increase of 31 members over the last published report. Of the total membership, 837 are regular members and 137 are associate members.

Pointing out that subsequent meetings of the Division hinge on the progress of the war and other circumstances, Chairman Street stated that there was a good possibility that the Division would hold only one meeting next year and that instead of meeting at Indianapolis or Minneapolis, the sites of the spring and fall meetings of the parent society, the probability was that the meeting of the Division would be held in Akron. This is of course speculative and definite decisions will be reached in the next few months by the Executive Committee.

The Division's banquet was held on Thursday night, September 10, in the Ballroom of the Hotel Statler, the overflow attendance of 619 setting a new all-time record for the Division, comparing with 440 attending the banquet at Atlantic City last year. An extremely entertaining program, arranged by Carlton M. Hub, theatrical manager of New York City, followed an excellent dinner. The entertainment was handled by the Buffalo Rubber Group and the officers of that group are to be commended for a job well done.

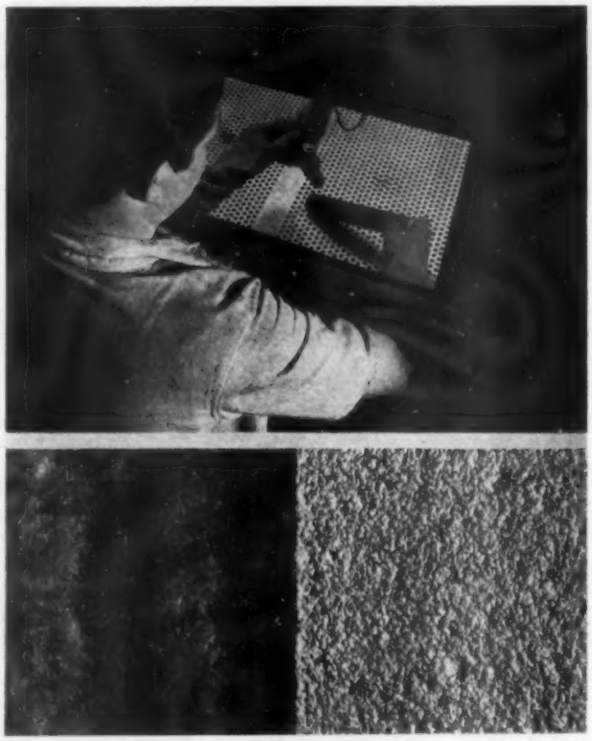
New Process Restores Rubber Typewriter Rollers

ANNOUNCEMENT of a new process which is said to make old typewriter rollers as good or better than new, increases their service by several years, and does not require the use of rubber, was recently made by the Office of Price Administration. The process was developed by A. R. Kemp and F. S. Malm of the Bell Telephone Laboratories. The research originated at the request of A. E. Pattinson, in charge of office-machine maintenance at the Bell Laboratories, which has nearly a thousand typewriter rollers that must be maintained in its own organization. The process has been turned over to O.P.A.

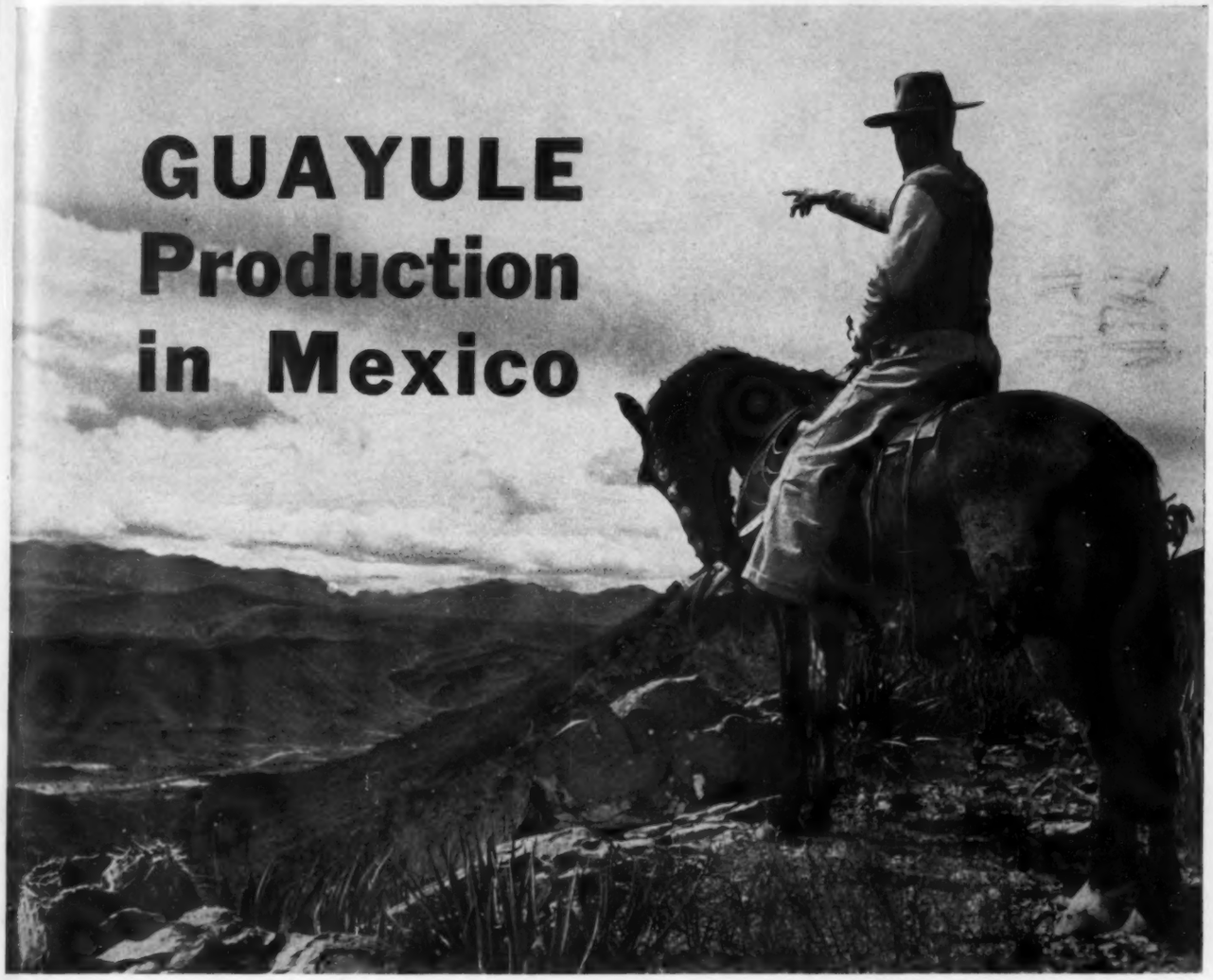
Typewriter rollers consist of an arbor of steel or wood over which is slipped a sleeve of rubber. The rubber is vulcanized on the arbor and then ground to bring it to the proper size and to roughen its surface so that it will grip the paper firmly. With use, the rollers become hard and glazed and no longer hold the paper securely. When this occurs, it has been customary to return the rollers to the factory to have the old rubber removed and new rubber put in its place. Some 1,000,000 rollers are replaced or renovated each year.

Messrs. Kemp and Malm discovered that by sand-blasting the glazed rollers for two or three minutes, using No. 90 steel grit and an air pressure between 15 and 20 pounds, a surface was formed that in many ways was superior to the original. The reduction in the diameter of the roller due to this surfacing is less than two-thousandths of an inch. Rollers treated in this manner have had hard service in the Bell Laboratories for more than six months without showing need for further treatment.

Typewriter rollers that have been ground have a grooved structure, while sand-blasted rollers have an irregular pattern of minute projections that grips the paper firmly in all directions. The sand-blasting, moreover, knocks out the fine particles of filler compound that otherwise would reduce the friction between paper and roller, much as talcum powder would. Typewriter rollers vary considerably in size but on the ordinary letter-page machine the rubber weighs in the neighborhood of a pound. Therefore, with over a million replacements a year, sand-blasting promises to save a million pounds of rubber compound annually.



TOP: One of the sand-blasting machines used at the Bell Telephone Laboratories for resurfacing typewriter rollers. BOTTOM: A typewriter roller as glazed by long use at the left and after sand-blasting at right—14 times actual size.



Photos, William Land from Three Lions

A Pictorial Presentation

WITH the use of guayule constantly increasing because of the current crude rubber situation and with its still further expanded use assured when greater quantities of synthetic rubber become available, due to its ability to increase the tack of such synthetics as Buna S, the accompanying photographs are particularly timely. The photographs depict the production of guayule rubber as it is now practiced at the factory operated by the Continental-Mexican Rubber Co. at Torreon, Mexico, and that of the Cia Hulera de Parras at Parras, Mexico.

Guayule grows in vast fields both south and north of the Rio Grande, although at present most of it is in Mexican territory. As the Guayule Emergency Rubber Project of the U. S. Department of Agriculture expands this picture will change, although the program launched through Congressional action includes guayule development in as many Latin American countries as possible, including Mexico.

In Mexico, most of the guayule grows at altitudes of between 4,000 and 7,000 feet in the states of Chihuahua, Coahuila, Durango, Nuevo Leon, San Luis Potosi, and Zacatecas. The rubber is in the cells of the cortex which underlies the bark of the root, stems and larger branches. Although guayule may be harvested in one-year crops, it produces the greatest amounts of rubber per plant when from four to seven years old. Wild guayule yields about 10% rubber per dry weight of shrub as compared with yields up to 23% from carefully cultivated plants.

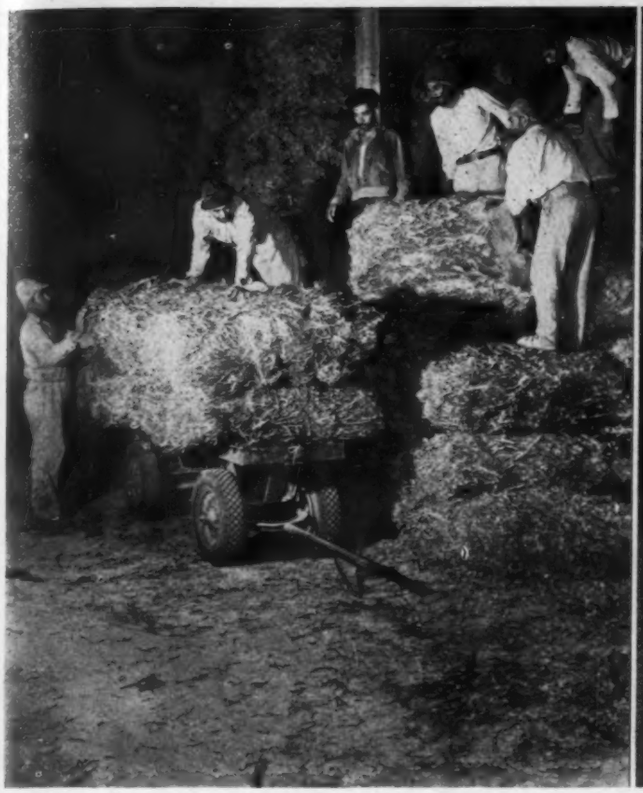
The processing of guayule follows a general pattern at most of the extraction plants in Mexico. Briefly, the plant is chopped into pieces by steel rollers; the pieces are crushed and run through revolving mills where the fibers are macerated and disintegrated by water and pebbles; the mass is then placed in settling tanks where the rubber rises to the surface and is skimmed off; the resin is sometimes left in the rubber

These guayule plants are about four years old at which age they contain about 10% of rubber.

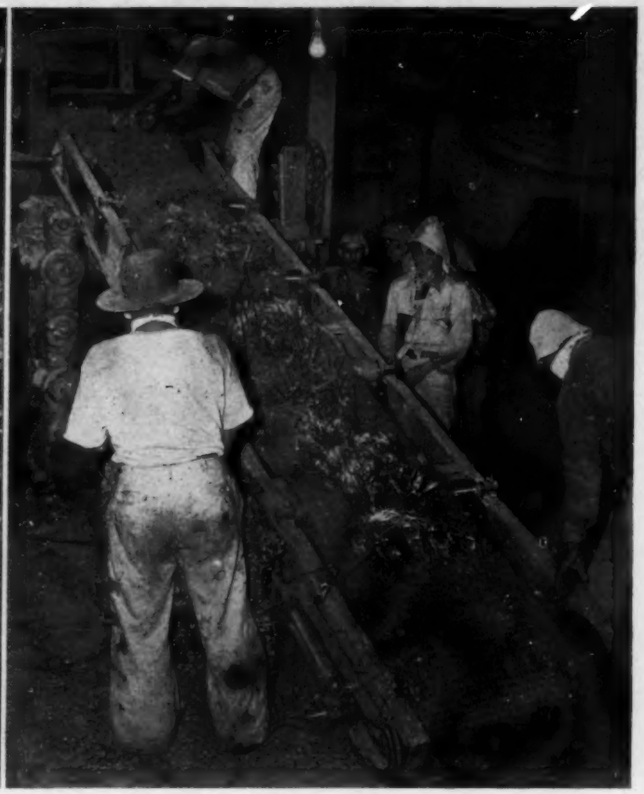
The plants are weighed by foreman or owner and the pickers paid according to amounts turned in.

After weighing, the plants are pressed into 100 kilogram (220 lb.) bales in presses of this type.

Baled guayule is generally transported by oxcart over steep mountain paths to the extraction plant.



After reaching the factory the guayule bales are generally first stored in cool, dry store houses.

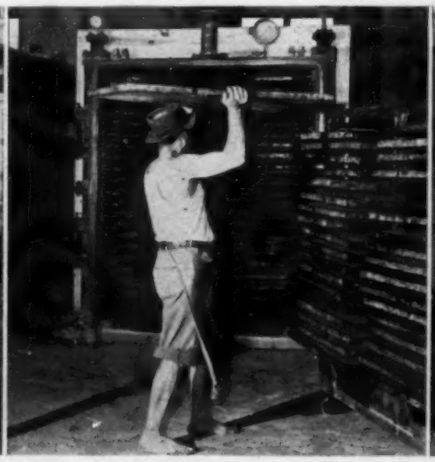


Here the guayule plants are being belt-conveyed into steel rollers which shred them thoroughly.

and sometimes removed by treatment with acetone or other solvents; the raw rubber is placed in trays and dried in vacuum dryers; the sheets are weighed and pressed into bales for shipment. Most of these operations are depicted in the accompanying photographs.

The collection of guayule in Mexico and in the United States, however, differs widely. As the photographs indicate, in Mexico the guayule is picked by Indians who load it on burros and sometimes transport it as much as 50 miles through almost impassable mountains to collection camps. They are paid by the landowners according to the quantities they pick and must furnish their own burros. The guayule is then pressed into crude bales and transported, usually by oxcart, to the extraction factories. The accompanying photographs tell the story well.

The plants are then put into rotating drums, with pebbles and water, to be pulverized.



Raw guayule rubber is placed in trays and kept in a vacuum dryer for about two hours.

The guayule sheets are then weighed and pressed into 110-lb. bales ready for shipment.

Abstracts of United States Patents on the Compounding and Use of Synthetic Rubber

By FREDERICK MARCHIONNA, M. S. Chem.

Part III

Collins—U. S. Pat. 1,967,865—July 24, 1934. *Polychloroprene Latex.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Delaware).

In the production of polychloroprene latex, chloroprene is dissolved and emulsified in water containing an emulsifying and an oxidizing agent, and the emulsion allowed to polymerize into a chloroprene polymer in the form of latex. The oxidizing agent may be an alkali persulfate, ammonium nitrate, benzoyl peroxide, potassium chlorate or permanganate, mercuric oxide, hydrogen peroxide, etc. In one example, water (400), sodium oleate (8), sodium perborate or potassium persulfate (4), and chloroprene (400) is emulsified and the emulsion kept at 10° C. for two days, thereby obtaining a polychloroprene latex which is stabilized by incorporating ammonia (16) and phenyl-beta-naphthylamine (4). This latex is then strained through several layers of cheesecloth and extruded through nozzles equipped with an extruding head of 0.66 mm. diameter into a coagulating bath of HCl and ethyl alcohol, in the ratio 1:4, to form strands of polychloroprene which are passed through an alkaline bath to neutralize any acid, and are then dried, dusted with talc, etc. Polychloroprene films may likewise be obtained from this latex in any convenient manner, such films having a tensile strength greater than similar films from natural latex.

Dunkel and Breurs—U. S. Pat. 1,969,397—August 7, 1934. *Safety Glass.* (Assigned to I.G. Farbenindustrie A.G., Germany).

A safety glass comprises at least two sheets of glass sandwiching an intermediate layer of a hydrogenated rubber which may be taken from natural or butadiene rubber. In one example, in which there is used a hydrogenated polybutadiene rubber, a film of regenerated cellulose is coated on both sides with a solution of hydrogenated polybutadiene obtained by hydrogenating the polybutadiene at about 120° C. so as to produce a hydrogenated polybutadiene solution having a concentration of 3.5% in cyclohexane, which will have a relative viscosity of 4.5 by immersion in a 40% solution of hydrogenated rubber in cyclohexane. The coated cellulosic film is dried, placed between two glass plates, and pressed at 30° C. under a pressure of 20 kgs./sq. cm.

Krauch and Cunradi—U. S. Pat. 1,979,946—November 6, 1934. *Tire Manufacture.* (Assigned to I.G. Farbenindustrie A.G., Germany).

In a method of making tires, the carcass is produced from rubberized fabric in any known manner, and the carcass covered with the polymerized product of a butadiene containing carbon black and vulcanizing ingredients, and the tire then vulcanized in the conventional manner. In the example given, a mixture of sodium butadiene rubber (100) is admixed with carbon black (40), zinc oxide (5), mineral rubber (5), wool grease (2), sulfur (2), an antioxidant (1), and mercaptobenzothiazole (1). This mixture is applied to the tire carcass in the form of a tread and cured in a press.

Krauch and Cunradi—U. S. Pat. 1,979,947—November 6, 1934. *Tire Production.* (Assigned to I.G. Farbenindustrie A.G., Germany).

This patent is similar to U. S. Pat. 1,979,946 and claims a method for manufacturing a tire in which the polybutadiene rubber composition is applied to the carcass in the form of preformed tread instead of the covering described in the previous patent. Thus, cords of fibers are formed into a weftless fabric by rubberizing with a composition of natural rubber, containing 30 parts of carbon black, in any convenient manner. Several plies of such weftless fabric are joined to form a carcass in which there is incorporated the bead. A composition containing sodium butadiene rubber (100), carbon black (70), stearic acid (6), sulfur (1), an antioxidant (1), and an accelerator (1) is rendered homogeneous and extruded into a tread of the desired configuration. This tread is laid over the fabric carcass and the assembled tire placed in a tire mold and vulcanized in a press at 140° C. for one and one-half hours, thereby obtaining a tire which has a high degree of resiliency and great resistance to abrasion.

Gebauer-Fuelnegg et al—U. S. Pat. 1,980,396—November 13, 1934. *Chlorobutadiene Films.* (Assigned to Marbon Corp., Chicago, Ill.).

Although this patent primarily deals with the production of rubber hydrochloride films by treating thin rubber sheets with anhydrous hydrogen chloride it also discloses the production of similar films with isoprene, as follows: About 20 cc. of isoprene are admixed with 10 cc. of anhydrous liquefied hydrogen chloride gas. A reaction takes place immediately, as evidenced by the rapid rise of the boiling point of the mixture, probably forming an isoprene hydrochloride. Excess HCl is allowed to evaporate and the reacted mass dried over calcium chloride to remove any moisture present therein. The anhydrous liquid reaction product is allowed to remain exposed to air and light until there is formed a brown viscous polymer which can be dissolved in a solvent and filmed into transparent and semi-elastic films of polyisoprene hydrochloride.

Patrick—U. S. Pat. 1,981,968—November 27, 1934. *Electrical Insulation.*

An electrical conductor is insulated with a layer of an insulating material comprising a polyethylene polysulfide which is rendered stable by heating. In a specific example, the polyethylene polysulfide (50) is softened by milling and compounded with natural rubber (3), zinc oxide (4), D. P. G. (0.125), antioxidant (0.46), carbon black (0.5), stearic acid (0.25), paraffine (0.25), and sulfur (0.23). This mixture is extruded in a tubing machine, the body being kept at 120° to 140° F. and the extruding head at 150° to 180° F. The resulting tube is fitted into a cylindrical mold which is forced through a tube of steam or hot water kept at 287° F. to stabilize the polysulfide. Before fitting the metal conductor in the

plastic tube, the tube is first filled with oil and drained to form a lubricant film on its interior periphery; the conductor is then inserted snugly, and cured. The insulating tube may be made from a composition comprising the plastic polyethylene polysulfide (44), natural rubber (2), whiting (22), zinc oxide (3), litharge (0.75), and wax (1). This latter composition has a higher dielectric constant than that described above containing carbon black.

Beck et al—U. S. Pat. 1,991,367—February 19, 1935. *Vulcanized Polybutadiene.* (Assigned to I.G. Farbenindustrie A.G., Germany).

A vulcanizate of better quality from polybutadiene rubber is obtained by incorporating sulfur and carbon black in a polybutadiene latex, the carbon black ranging from 20 to 80% and the sulfur from 0.5 to 60% of the quantity of the polybutadiene. In the example given, 2,000 parts of a latex, obtained by polymerizing an aqueous emulsion of butadiene containing 10% of ammonium oleate and 2% of a 10% aqueous hydrogen peroxide, together with 10% of polybutadiene, are mixed with sulfur (4), dicyclohexylamine dithiocarbamic dicyclohexylamine (8), and gas black (140) which has been previously wetted with the above latex. This compounded latex is coagulated with acetic acid, washed with water, dried below 100° C., and vulcanized by heating for one hour at 151° C. About 10 parts each of rosin and Kautschol (an oily bituminous softener) may be added to the coagulated compounded mixture. A quantity of natural latex may be incorporated in the compounded latex.

Wulff, Moll and Breuers—U. S. Pat. 1,998,350—April 16, 1935. *Lubricating Oils.* (Assigned to I.G. Farbenindustrie A.G., Germany).

An improved lubricating oil comprises a lubricating oil and at least 0.5% of a hydrogenated hydrocarbon polymer having a molecular weight of at least 800, which is not appreciably decomposed when heated up to 200° C. for five minutes. Such polymeric hydrocarbon includes hydrogenated natural rubber, a polydiolefine, hydrogenated cyclized rubber, etc. In one example in which there is used a hydrogenated polybutadiene, the polybutadiene produced in any convenient manner and hydrogenated in the usual manner, 2 to 5% of the hydrobutadiene is added to a synthetic naphthalene oil having a boiling point of 300° to 350° C., produced by the alkylation of the naphthalene in the presence of aluminum chloride. The resulting lubricating oil has a relative viscosity of 0.264 and 0.50 at 60° C. when 2 and 5% of the hydropolybutadiene are respectively added to the lubricating oil as compared with 0.17 at 60° C. which the naphthalene oil has alone.

Camerota—U. S. Pat. 1,999,084—April 23, 1935. *Packing for Pipe Joints.* (Assigned to Florence Pipe Foundry & Machine Co., Florence, N. J.).

A packing for pipe joints comprises a ring made of rubber composition, the ring having arched reinforcing elements embedded therein, at opposite ends, closely following the surface contour of the ring at these ends. The reinforcing element is adapted to flatten when the packing ring is under compression. A thin non-corrosive coating from a solution of Thiokol is applied around the outer periphery of the ring to include the outer surface of the reinforcing element.

Christenson—U. S. Pat. 2,008,682—July 23, 1935. *Ring Packing.* (Assigned to Johns-Manville Corp., New York, N. Y.).

A specific embodiment of U. S. Pat. 2,052,603 for making a ring packing for automobile axle assembly for the purpose of preventing the passage of oil or grease from the differential through the housing around the axle to the brakes in the rear wheels. In this packing there are used laminations of asbestos cloth impregnated with polychloroprene and laminations of similar cloth impregnated with natural rubber. The ring comprises a lip or flange portion formed of layers of polychloroprene-impregnated cloth and a body portion of rubber-impregnated cloth. These stock composite layers are brought together and the several strips are alternated and overlapped at a side edge portion of each. The assembly is placed in a press die provided with a circular ridge, heated to shape the article and to form therein a groove corresponding to the ridge of the die, and partially cured under a steam pressure of 70 pounds. After it is removed from the die, a coiled annular steel spring is placed in the bottom of the groove and the packing ring then given a final cure at 70 pounds steam pressure for 45 minutes.

Collins—U. S. Pat. 2,010,012—August 6, 1935. *Polychloroprene-Protein Mixture.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Delaware).

A mixed aqueous dispersion of casein, glue, etc., and polychloroprene is obtained by mixing in the usual manner and then dispersing the mixture in water, using soap as the dispersing agent. In one example, casein (2) dissolved in glacial acetic acid (104) is added to water (260) and chloroprene (92) dispersed in the solution, resulting in a stable polychloroprene latex after polymerization. In the production of this type of mixed dispersion, it is essential that the protein and the polychloroprene be neither alkaline nor acid. In another example, 16.6% of a casein solution in ammoniated water is stirred into 106 parts of a 47% alkaline dispersion of a polychloroprene, and the mixed dispersion allowed to age for 24 hours before use. In still another example, 25 parts of casein are kneaded with glacial acetic acid (75) to form a gel which is diluted with water, and 14.5% of concentrated casein solution with 50 parts of the casein gel added to 22.7 parts of a 20% acid polychloroprene latex. When two glass plates are cleaned with a soap solution and the cleaned surfaces coated with a latex containing gelatine (1), polychloroprene (2), and water (57), dried, sandwiched with a pyroxylin sheet, and the complete assembly subjected to heat and pressure—110° C. and 150 lbs./sq. in.—for five minutes, there will be obtained a non-shattering safety glass. Another latex is obtained by mixing 50 parts of a mixture from casein (166) solution and soap (300) with concentrated NaOH (15), zinc oxide (100), 47% polychloroprene (22), and 2% of sodium silicate (10) to produce a sprayable latex which can be treated with formaldehyde to insolubilize the latex coating.

Cutler—U. S. Pat. 2,012,223—August 20, 1935. *Textile Roll.*

A roll or apron suitable for textile operations, such as drawing, feeding, etc., comprises a metal shaft covered with a thick surface layer which will not carry or cause production of static electrical charge. The layer consists essentially of a polychloroprene or polybromoprene or polyethylene polysulfide plastic. A suitable formula for the surface layer consists of polychloroprene (100), soft gas black (50), magnesium oxide (10), zinc oxide (5), and Neozone D (0.5). It is advisable to deodorize the polychloroprene used by treating it with the gas, vapor or liquid form of triethanolamine and then incorporating a small amount of musk, lavender, ginger root, sassafras, mint, etc., as reodorant, then compounding it with the other ingredients.

Denman—U. S. Pat. 2,012,259—August 27, 1935. *Friction Lining.*

A non-pitting friction lining comprises an organic binder which may be of natural rubber or a mixture of rubber and polychloroprene with finely divided asbestine and a phenol-aldehyde resin. While the patent discloses a binder of natural rubber, it states that in place of rubber there may be used the polychloroprene, as described in the *Journal of the American Chemical Society,* November, 1931, pages 4203 to 4225, which will impart to the friction lining greater oil and heat resistance. Thus, the composition for the brake lining may comprise natural rubber or the alpha-polychloroprene (12 to 20), rosin (2.5 to 5), asbestine or talc (65 to 70), lime (1 to 5), magnesium oxide (1.5 to 2), a wax (1 to 5), with sulfur, zinc oxide, and an accelerator if required. From 25 to 50% of a phenol-aldehyde resin—calculated on the weight of the polychloroprene—is also added and the mixture molded and cured into a brake lining.

Calcott and Reynolds—U. S. Pat. 2,034,895—March 24, 1936. *Molding Material.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Delaware).

A molding composition comprises a liquid polymer of acetylene mixed with a filler and a small quantity of an antioxidant. The polymerizable polymer of acetylene may be obtained as described in U. S. Patents 1,811,959 and 1,812,849, or it may be prepared from hydrocarbon mixtures obtained by passing acetylene into a mixture of 945 parts of ammonium chloride in water (1,000) and cuprous chloride (2,850) plus copper powder (100) which will cause the production of a viscous liquid from which any volatile hydrocarbons are removed. In one example, 25 parts of the oily polymer, 747 parts of wood flour, and 1 part of phenyl-beta-naphthylamine are placed in a mold and heated at 160° C. and 2,000 lbs./sq. in. pressure for 40 minutes to obtain a solid coherent article. In another example, 50% of the oily polymer with 49% of wood flour and 1% of antioxidant are placed in a mold and cured at 140° C. for one hour under a pressure of 6,500 lbs./sq. in. Instead of wood flour, pyrites, clay, asbestos, carbon black, gypsum, etc., may be used as filler.

Beebe—U. S. Pat. 2,038,339—April 21, 1936. *Stencil Production.* (Assigned to Scovill Mfg. Co., Waterbury, Conn.).

In a method of making a stencil, a design is photographed on a plate covered with a light sensitive film. The plate is then secured to one face of a fabric and a protective backing film applied to the other face of the fabric. The portion of the plate not covered by hardened gelatine sensitive film is etched, the protective backing film is removed, and a protecting backing is applied to the fabric over the design portion of the plate. A heat-hardening film is now applied over the design portion of the plate and over the corresponding side of the fabric. The second backing film is then removed, the heat-hardening film hardened completely and removed from the outer surface of the design portion of the plate, and the latter etched away. The heat-hardening film may be from Thiokol (polyethylene polysulfide). As the Thiokol obtained from a latex thereof has a tendency to shrink, there is incorporated therein about 1% of a saturated solution of D. P. G. in alcohol, and heated in a water bath for 4 to 5 hours. This material is then sprayed, spread, etc., preferably after having admixed therein from 5 to 10% of zinc oxide, which will prevent the coating from hardening.

Lewis and Weiss—U. S. Pat. 2,040,698—May 12, 1936. *Vulcanization Process.* (Assigned to Vulcan Proofing Co., Brooklyn, N. Y.).

Natural rubber is vulcanized by the use of Thiokol as the sulfurizing agent. Soft or hard rubber can be obtained by heating the natural rubber with the desired quantity of Thiokol and a small quantity of a thiuram disulfide accelerator. A soft vulcanized rubber is obtained by heating a mixture of rubber (50), Thiokol (1.75), tetra-methyl-thiuram-disulfide (0.75), mercaptobenzothiazole (0.25), phenyl-beta-naphthylamine (1), stearic acid (0.5), zinc oxide (22), and clay (24), in a hydraulic press at 278° F. for three hours. A hard rubber is obtained from a composition which comprises rubber (50), Thiokol (25), thiuram disulfide accelerator (2.5), zinc oxide (5), magnesium carbonate (5), stearic acid (5), paraffine wax (5), and carbon black (25). A quantity of hard rubber dust may also be added if desired.

Richardson—U. S. Pat. 2,042,483—June 2, 1936. *Cementing Soles to Shoes.* (Assigned to United Shoe Machinery Corp., Boston, Mass.).

In the cementing of outsole to the bottom of a welted and inseam-trimmed shoe, a cement of polychloroprene in a volatile solvent is applied to the shoe bottom, the bottom of the outsole, and the welt, and allowed to dry into tacky condition. The cemented face of the outsole is then pressed over the shoe bottom surface, thereby bonding the outsole firmly to the bottom of the shoe, and the welt around the periphery of the shoe.

Buffington—U. S. Pat. 2,046,724—July 7, 1936. *Refrigerator Seal.* (Assigned to General Motors Corp., Dayton, Ohio).

A shaft sealing gasket for compressors and pumps of refrigerators using gaseous refrigerants consists of a metal ring having a reversed L-shape cross section. An annular ring of polychloroprene, polybutadiene, etc., is mounted within the 90° angle of the ring, and cured thereto. This polychloroprene ring is treated with a material which reduces its friction with the metal ring, and improves the sealing and wearing qualities of the gasket. This treatment consists in incorporating in the polychloroprene ring metal particles having low coefficient of friction in the presence of oils. Pure silver powder meets these requirements. It is incorporated in the polymer mass, or applied over the wear surface of the ring in any convenient manner, so that the metal powder will be embedded at the exposed surface of the polychloroprene.

Duecker et al—U. S. Pat. 2,046,871—July 7, 1936. *Plastic Products.* (Assigned to Texas Gulf Sulfur Co., Pittsburgh, Penna.).

The polysulfide plastic described in U. S. Patent 1,890,231, and sold as Thiokol, is combined with sulfur and an oxide or sulfide of arsenic or phosphorus to obtain a plastic mass of reduced viscosity which can be used for impregnating porous materials. In one example, the mass may comprise sulfur (75), phosphorus sulfide (0.125 to 2.5), and Thiokol (25), with or without silver chloride (1.25 to 5), and may be cured at 140° C. from one to four hours. In another example, there is used sulfur (90), Thiokol (10), and phosphorus sulfide (0.25).

Stahl—U. S. Pat. 2,047,297—July 14, 1936. *Molding Sand Core.* (Assigned to Aristo Corp., Detroit, Mich.).

A molding sand core is obtained by mixing a sand with a polydiolefine, obtained in the treatment of hydrocarbon distillates, and a vegetable drying or semi-drying oil. The polyolefine consists mainly of polybutadiene and is produced by treating gasoline with concentrated sulfuric acid and Fuller's earth to remove any gum-forming ingredients. By distilling the residue from this distillation there is obtained a high melting point pitch-like polymer consisting essentially of polybutadiene. By mixing 20 to 90% of this polymer with 10 to 40% of linseed oil and 40% of a resin oil or kerosene, and incorporating therein the required quantity of sand—which may vary from 20 to 200 parts for each part of polymer—there is obtained a good sand core material.

Patrick—U. S. Pat. 2,049,974—August 4, 1936. *Composite Products.* (Assigned to Thiokol Corp., Trenton, N. J.).

A layer of the plastic product obtained by reacting an alkylene polyhalide, *e.g.*, ethylene dichloride, glyceryl dichloride, dichloroethyl ether, etc., with an alkali metal polysulfide, is joined to a layer of compounded natural rubber and the composed structure integrated by vulcanization. A small quantity of natural rubber—from 5 to 20%—can be incorporated in the polyethylene polysulfide to enhance its adherence to the rubber layer. In the example given, a polyethylene polysulfide plastic containing 16% by volume of carbon black or zinc oxide, and a small quantity of rubber, but no wax and stearic acid, is sheeted and laminated with a similar sheet from a rubber composition containing 15% by volume of carbon black or zinc oxide, with sufficient sulfur and an accelerator to cause vulcanization to be effected at 287° F., the assembly placed in a press, and heated at 287° F. for about 50 minutes to cure the two layers into a strongly adherent integral sheet.

Christenson—U. S. Pat. 2,052,603—September 1, 1936. *Stuffing Box Packing.* (Assigned to Johns-Manville Corp., New York, N. Y.).

A packing for stuffing boxes includes a facing portion of asbestos cloth impregnated with a polychloroprene and a layer of another cloth impregnated with rubber, the two layers being integrally united. The packing is sealed at the edges

with a polychloroprene seal. In one example, an asbestos cloth, which may contain wire reinforcement, is impregnated with a polychloroprene containing 6% of pine oil or dibutyl phthalate as plasticizer, the mixture being dissolved in benzol. The fabric thus treated may be given a calendered coating from a polychloroprene and cured at 130° C. for one hour. This coated fabric may then be laminated with an asbestos cloth impregnated with a solution of rubber. One or more chloroprene sheets may be joined to one or more rubberized fabrics in such a way that the chloroprene sheets will form the facing of the article. The assembly is then pressed and cured. In another example, several strips of polychloroprene-treated cloth and several strips of rubberized cloth are laid side by side, the polychloroprene sheets being arranged to form the flange of a packing ring and the rubberized fabric layers forming the rest of the body of the ring, the sheets being alternate and overlapping each other at an edge which will constitute the base of the U-shaped packing. The various layers are preferably wetted with a solvent before being joined. The assembly is placed in a die press and cured at 150° C. for one hour into a U-shaped ring.

Driscoll—U. S. Pat. 2,052,610—September 1, 1936. *Heat-Resistant Product.* (Assigned to Johns-Manville Co., New York, N. Y.).

A heat and wear resisting composition suitable for use as packing and friction lining comprises a heat-resistant filler, such as rock wool, asbestos, etc., and polychloroprene binder. In one example, the composition comprises plasticized polychloroprene (22.1), magnesium oxide (6.8), zinc oxide (6.8), gas black (1.1), and antioxidant (0.2). This mixture is milled and treated with sufficient benzol to form a thin cement into which there is incorporated 63 parts of short chrysolite asbestos to form a plastic mass, which is heated to evaporate the solvent, calendered into sheet, and heated at 130° to 150° C. for a time sufficient to effect further polymerization of the polychloroprene. A packing from such a sheet, when contacted with heated oils at 300° F. for 70 hours, shows only about 43% of decrease in strength. A polychloroprene product which has been treated at 500° F. and cooled is much harder and stiffer than the original product, but is still flexible. In another example, an incompletely polymerized polychloroprene, containing 10% of magnesium oxide, is reduced into a thin cement, and asbestos fibers worked with the cement to form a plastic mass which is banked and passed vertically down two steel rolls running at the same speed and heated at 200° F. to form a sheet having longitudinally aligned fiber, which is cured at higher temperature. Natural rubber may be incorporated.

Twiss and Neale—U. S. Pat. 2,056,026—September 29, 1936. *Organic Polysulfide Plastics.* (Assigned to Dunlop Rubber Co., London, England).

This patent is directed to the preparation of a plastic composition by reacting a water-soluble metallic thiosulfate, in non-acid solution, with a halogenated aliphatic hydrocarbon, such as ethylene dichloride, isoprene polyhalide, etc. The patent also discloses rubber compositions containing these polysulfide plastics which will not swell in oils. Thus, a polyethylene polysulfide plastic—obtained by treating ethylene dichloride, dissolved in ethyl alcohol, with sodium thiosulfate, dissolved in water, which reaction product may be oxidized by treating a hot solution thereof with chlorine—is admixed with rubber to obtain a composition containing the following: crude rubber (100), sulfur (3), zinc oxide (5), accelerator (1), stearic acid (2), carbon black (19), and polyethylene polysulfide plastic (19) secured as above. When this composition is cured there is obtained a rubber product the swelling of which in benzene at 25° C. in 24 hours is reduced about 190% when compared with a similarly cured mixture in which the polysulfide plastic is replaced with an equal quantity of glue.

Duecker et al—U. S. Pat. 2,056,836—October 6, 1936. *Coating Material.* (Assigned to Texas Gulf Sulfur Co., Pittsburgh, Penna.).

A coating material for covering metals comprises the polysulfide plastic known as Thiokol together with sulfur and a halide of mercury, copper, silver or lead. When heat cured, this material will form an elastic coating. In one example, a metal coating comprises sulfur (75), Thiokol (25), and copper or silver chloride (2.5). When this material is spread on a metal surface and cured at 120° to 210° C. there is produced a strongly adherent, elastic coating. In another example, a cleaned steel surface is coated with a composition containing sulfur (50), Thiokol (50), mercuric chloride (5), zinc oxide (5), diphenylguanidine (0.17), and carbon black (30), and cured as above. While any of the above compositions may be used alone for coating metals, they may be used also as an intermediate bond for adhering rubber to metal.

Wedger—U. S. Pat. 2,061,296—November 17, 1936. *Bonding Leather to Shoe.* (Assigned to B. B. Chemical Co., Boston, Mass.).

Leather soles are attached to shoe bottoms by coating the surface of the insole or shoe filler with a polychloroprene solution, applying a similar cement coating to the sole bottom, and, after drying, pressing the coated surface together so as to effect a strong bond between the shoe outsole and the bottom of the shoe. The polychloroprene is preferably deodorized and dissolved in a liquid solvent mixture of 1:1 benzol and trichloroethylene, using 3 pounds of polychloroprene for each gallon of solvent. About 2% of phenyl-beta-naphthylamine may be added as stabilizer and inhibitor of further polymerization, together with 2 to 10% of a softener—wood rosin, abietic acid, etc.—and 10% of magnesium oxide, and an accelerator, such as hexa, thiuram disulfide, aldehyde-aniline, etc., which promote polymerization of the polychloroprene.

Wedger—U. S. Pat. 2,061,297—November 17, 1936. *Shoe Sole Treatment.* (Assigned to B. B. Chemical Co., Boston, Mass.).

In the manufacture of shoes, and particularly in the laying of the channel flap on the leather sole, the cooperating surfaces of the channel flap of the sole are coated with a polychloroprene cement in a volatile solvent. A greater portion of the solvent is evaporated and before the polychloroprene cures the channel flap is pressed over the channel base of the sole, the cement then being fully cured to effect a strong bond between the cemented surfaces. The cement used comprises a plastic deodorized polychloroprene (300), rosin (15), magnesium oxide (30), zinc oxide (5), sulfur (6), phenyl-beta-naphthylamine (8), and tetraethyl thiuram monosulfide (3) dissolved in 630 cc. of each of benzene and trichloroethylene.

McDonald—U. S. Pat. 2,067,854—January 12, 1937. *Deodorized Polychloroprene.* (Assigned to B. B. Chemical Co., Boston, Mass.).

Polychloroprene is deodorized by calendering it into a sheet about 1/32-inch thick and treating this sheet with an aliphatic monohydric alcohol, such as methyl, ethyl, propyl, or butyl alcohol. Thus, the polychloroprene sheet is placed in a rotating drum containing sufficient alcohol to completely cover the polychloroprene, and the drum rotated until the typical smell of the polychloroprene has decreased. The alcohol is removed from the drum, fresh alcohol introduced therein, the drum again rotated, and the cycle of operations repeated until the polychloroprene is substantially odorless. In the specific example, 50 pounds of polychloroprene in the form of sheet is placed in a ball mill together with 150 pounds of dry ice—solid carbon dioxide—and the ball mill operated to crush the sheet into fragments which are treated with the alcohol in the drum, as described above.

(To Be Continued)

GET IN THE SCRAP

Every rubber factory is a potential supplier of large quantities of scrap. Knowing the value of scrap rubber, these factories should bend every effort to contribute to the overall scrap salvage campaign—metal, rags, paper, rubber, etc.

Editorials

The Baruch Report

HOW well the so-called Baruch Rubber Committee, headed by Bernard Baruch, assisted by James Conant of Harvard and Karl T. Compton of M.I.T., as well as a host of special investigators on all phases of the problem, fulfilled its function is, in our opinion, exemplified by the fact that the committee wasted no time in recriminations but devoted its full report to recommendations aimed at solving the crucial problem faced by the country today arising from the simple fact that the stock of crude rubber is inadequate to fill military and other essential demands between now and the end of next year.

The committee vividly points out that unless the synthetic rubber program has reached adequate levels by the end of 1943 the military needs of this nation will be faced with a deficit and, as we have stated before, wars cannot be fought with deficits in materials.

The committee, thankfully, pulled no punches. It put the issue squarely up to the American public—Discomfort or Defeat! It served adequate notice that the oft-repeated reports of the rubber shortage being a myth was far from such a state. It used facts and figures not fancies and figments of imagination to indicate how serious—yes, even dangerous—the present shortage is. And then went on to make recommendations to assure the nation and its allies of adequate supplies in the near future.

How realistically the committee tackled its job is also indicated by its statement that it seeks not a counsel of perfection but rather prompt action by every means available to increase the nation's production of synthetic rubber. It takes cognizance of the fact that "there still is room for reasonable scientific disagreement over many of the processes for making rubber that are being developed." It concedes the probability that before much of the synthetic rubber now planned is produced better processes will have proved themselves. But, because the need for rubber is so great the committee believes it "is too great to wait upon perfection" and suggests that the present program be "bulled" through with the greatest possible speed.

Although recognizing the need for the rapid development of domestic rubber-bearing plants, the committee puts its full faith in synthetic rubber—all synthetic rubbers, in fact. It recommends that Buna S facilities be increased to 845,000 tons, neoprene to 69,000 tons, Thiokol to 60,000 tons, Butyl rubber to 132,000 tons, and all other synthetics, such as Flexon, to whatever production capacity can be brought into being without taking anything away from all of the other synthetics. Additional butadiene and styrene plants to take care of the expanded polymerized products would of course have to be provided.

As far as the public is concerned, the committee is fully aware that the rubber in tires now on the nation's 27,000,000 passenger cars represents our greatest stockpile of rubber, a point emphasized by the country's leading rubber executives for the past several months, most of whom expressed considerable gratification over the committee's report. In recognition of this fact, the committee recommends drastic action where the public is concerned: Nation-wide gas rationing, restricting mileage to 5,000 miles per year, compulsory periodic tire inspection, etc. However, the committee also recognizes the necessity of maintaining essential civilian transportation and urges that greater amounts of recapping materials be made available and even some new tires from present carefully-conserved stockpiles.

We urge that every member of the rubber industry carefully read every word of the Baruch Committee's report—a digest of which will be found elsewhere in this issue. It represents a difficult job done remarkably well. Messrs. Baruch, Conant and Compton fulfilled the hope placed in them by the industry and merit sincere congratulations from both the industry and the public at large.

CURRENT NEWS OF THE MONTH

REPORT OF THE BARUCH RUBBER COMMITTEE FEATURES THEME "DISCOMFORT OR DEFEAT"

THE so-called Baruch Rubber Committee, headed by Bernard Baruch, with Dr. James B. Conant, president of Harvard University, and Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, as his colleagues, appointed by President Roosevelt on August 6, rendered its report to the President on September 10. The President immediately turned the report over to Congress, intimating that he would use all of his powers to put the recommendations of the special committee into effect as quickly as possible. It is believed that the President can follow this course of action without awaiting any special legislation by Congress. For the benefit of our readers, a complete digest of the 20,000-word report, as prepared by the committee itself, is reproduced in full on Page 506 of this issue.

Taking a very serious view of the entire rubber situation the report recommends several drastic measures, warning that the American public has one choice only: Discomfort or Defeat. The committee found the existing situation to be so dangerous that "unless corrective measures are taken immediately, this country will face both a military and civilian collapse." This statement was backed up with figures (which will be found in the digest of the report) which indicate that estimated military and essential civilian rubber needs will be faced with a deficit of 211,000 tons by the end of 1943 which must be met with synthetic rubber. Stepping up synthetic rubber production to 1,100,000 tons was one of the recommendations made. Other highlights of the report follow:

Other Highlights of Report

(1) That a rubber administrator be appointed by the chairman of WPB, the administrator to be delegated full responsibility and authority of all phases of the rubber program.

(2) That cars and trucks be restricted to 35 miles an hour, with average annual mileage held to 5,000 miles.

(3) That a new gasoline-rationing system be devised based on 5,000 miles a year of driving per car.

(4) That more rubber be released to the public for recapping old tires, or that new ones be issued, so as to maintain fully necessary civilian driving.

One of the more important recommendations of the committee was for "a complete reorganization and consolidation of governmental agencies concerned with the rubber program." In this connection, the committee severely criticized the present administration of the rubber program, without citing names. It pointed out several steps which should have been taken by those in charge, including closer and earlier cooperation with the Russians who have been making synthetic rubber in large quantities for years. Technical decisions made by non-technical men was another criticism made.

The committee laid down a seven-point program for synthetic rubber recommending that there be no further substitutions in present plans, an additional 140,000 tons of Buna S production capacity be provided, the refinery-conversion program be increased to yield an additional 100,000 tons of butadiene, construction of butadiene and styrene plants be rushed to promote maximum production of Buna S in 1943, an additional 20,000 tons of neoprene, construction of a butadiene plant and a polymerization plant in the farm belt to give 30,000 tons of Buna S based on grain, and immediate erection of plants to produce 100,000,000 gallons of alcohol yearly located in or near grain centers.

Other recommendations of the committee, all of which are elaborated on in the digest, call for reallocation of necessary materials to synthetic rubber plants, the removal of legal restrictions so as to provide for larger cultivation of guayule, the increase of rubber reclaiming capacity by 20 per cent, a study of rubber manufacturing facilities to determine whether they are sufficient to handle the large supplies of synthetic rubber eventually to be made available, and plans for a second intensive scrap rubber drive to be held in about one year from now.

Reaction to the Report

The reaction of the rubber industry itself to the Baruch Committee report was for the most part favorable, although it was intimated that the committee had been very careful in the matter of the production of butadiene from petroleum and from alcohol based on grain. This was the matter which led the Congressional farm blocs to introduce special legislation which was passed by both the Senate and the House and which was vetoed by President Roosevelt.

According to an official of one of the larger oil concerns, all of the increased production called for in the Baruch report could be supplied readily, without resort to any extended construction program, by the nation's petroleum refineries.

The Russian method for making synthetic rubber referred to in the report was said to be thoroughly practical, but as alcohol is employed in this process exclusively the costs would run considerably above those for petroleum butadiene, according to chemists.

The recommendations for increased supplies of Thiokol, of reclaim or other substitutes were considered a far better approach to the civilian's tire problem than has been put forward from official quarters in charge of the rubber program.

May Revive Grain Bill

There is a distinct possibility that a hard fight will develop in Congress on the report. Farm bloc senators and representatives are studying the report closely and have already given warning that if the contemplated rubber-from-grains program is not given its rightful place in the overall synthetic rubber plan the Gillette-Fulmer bill, vetoed by the President, will be revived.

It was learned that the recommendation contained in the Baruch report for the erection of a 27,000-ton butadiene plant to utilize grain and an associated

NEW RUBBER ADMINISTRATOR

William M. Jeffers, president of the Union Pacific Railroad, was named Rubber Administrator by Donald M. Nelson, WPB Chairman, on September 15. The appointment of a Rubber Administrator followed the recommendation made by the Baruch Committee. Mr. Jeffers will be vested with all the authority of the chairman of WPB over the rubber program in all of its phases. In turn, he will issue directives to all government agencies concerned with rubber. Mr. Jeffers is 66 years old and has been associated with Union Pacific all of his working life.

polymerization plant to produce 30,000 tons of Buna S, both to be placed near the center of grain production, had been previously approved by WPB just before the committee was organized. This plant will be put under construction in the next several months.

According to Senator Gillette, who heads the subcommittee of the Senate Agriculture Committee, which held hearings on the rubber situation for almost four months before recommending special legislation, this plant will be located at Muscatine, Iowa, and operated by two men, named Stein and Kent, who own and operate a concentration and storage business for grains.

The Publicker Commercial Alcohol Co., which is operating a pilot plant for the production of butadiene from grain-alcohol, based on the Polish process, is interested in the Muscatine proposition and designed the plant. Publicker also obtained financial help for Messrs. Stein and Kent from the RFC.

RUBBER PLACED UNDER STRICT ALLOCATION; OTHER OFFICIAL ORDERS

Long expected by the industry, the consumption of crude rubber, latex, reclaimed rubber and scrap rubber in all civilian products was placed under strict allocation by WPB as of September 1. This change from the previous system of rubber control, which permitted the consumption of rubber for many groups of products in accordance with average monthly consumption during a base period, is provided for in a revised Supplementary Order M-15-b. The revised order, issued on August 25, consolidates the original order and the thirteen amendments which had been issued since last December.

The original M-15-b order (not to be confused with Order M-15-b-1, which provides specifications for rubber products) included two types of product-listings for which rubber and latex could be consumed. The first involved the use of a percentage formula based on previous consumption, while the second enumerated products for which a manufacturer was required to secure specific authorization.

Several products termed necessary to the war effort, which were not permitted to be manufactured under the terms of the original order, have been added to the new revised order. These additions, which include compounds for laboratory testing and rubber life-saving suits, are based on experience gained in handling appeals. The new order also includes a list of products in which the use of all forms of rubber are specifically prohibited in the filling of civilian orders. Among other important changes made by the revised order, which is reproduced in full elsewhere in this issue, are the following:

Other Changes Contained in Order

1. Instead of permitting the use of crude rubber, latex, reclaimed rubber and scrap rubber in any products being made on war orders, the revised order restricts the use of rubber for war orders to specified products or classes of products. This list is not yet complete, and for the time being, the order permits the manufacture of any product for war orders as in the past. As soon as the list is worked out by WPB and armed forces, it will be incorporated into the M-15-b regulations. As in the case of civilian orders, the new M-15-b includes a list of products which shall not be manufactured from rubber, latex, reclaimed rubber, and scrap rubber for war orders.

2. The provision classifying as war orders purchases placed by foreign countries is omitted. Such purchases will not be considered war orders unless placed by an agency of the United States Government under the Lend-Lease Act.

3. The processing of crude rubber, latex, reclaimed rubber or scrap rubber to fill war orders is not permitted unless the resulting products are scheduled for delivery within sixty days from the date of processing under the terms of the purchase order placed with the processor. This is designed to prevent the consumption of rubber in products which are scheduled for delivery many months in advance.

4. In order to prevent a waste of rubber, the splitting of camelback and capping stock into sizes which cannot be manufactured under the provisions of the rubber specifications order (M-15-b-1) is prohibited.

5. The delivery or acquisition of any products or materials known or believed to be manufactured in violation of the order is prohibited.

6. To encourage the operation of reclaiming plants at full capacity in anticipation of heavy demands next year, the limitation on inventories is modified to permit reclaimers, as well as consumers of reclaimed rubber, to stockpile reclaimed rubber.

7. Restrictions on imports are modified so that they apply only to products containing 10 per cent or more rubber or balata. This removes from the prohibition articles containing a small amount of rubber cement or other forms of rubber and balata in small amounts.

Another modification permits any person to import for his personal use, during any calendar month, products containing not more than 25 pounds of rubber or balata, except that this provision does not apply to tires.

A provision is contained in the new order to the effect that all persons who wish to consume crude rubber, latex, reclaimed rubber or scrap rubber after October 1, 1942, are required to file an application on Form PD-407 with the Rubber Branch not later than the tenth day of the preceding month. Authorizations for September will be issued as they have been in the past. Appeals from any of the terms of the order may be filed with the Rubber Branch on Form PD-500b. For the convenience of all manufacturers affected by the order, an index of the permitted and prohibited products and a table of contents have been included.

Rubber Yarn and Elastic Fabric

Restrictions on the sale, distribution and use of elastic fabric, rubber yarn and elastic thread have been tightened further by amendments to Conservation Orders M-124 and M-174, issued by WPB on August 26. The new orders prohibit the processing of any elastic fabric, rubber yarn or elastic thread except to fill orders or contracts with the Army, Navy or specified Government agencies, or for use in a limited list of essential health and industrial articles, this list including industrial inhalators, respirators, hose masks, gas masks, goggles, shoes, surgical stockings, artificial limbs, and surgical elastic bandages for joints.

The new orders prohibit the use of elastic fabric, rubber yarn or elastic thread in a list of essential health and industrial articles which were allowed by the original orders. The articles affected by this prohibition are industrial belting and flexible metallic hose, repair cords and webs, edging for baby pants, supports for abdomen, back and breast, sanitary belts, and men's athletic supporters.

In addition, manufacturers, knitters, weavers, jobbers and dealers are required to file detailed reports of their inventories. According to WPB, the information obtained from these inventory reports will be used to determine the extent to which the manufacture of essential civilian articles will be permitted. Therefore, new amendments are to be expected as soon as WPB collates this information.

Under Order M-174 as now amended (elastic fabric), stocks of all elastic fabric up to six inches in width in the hands of manufacturers and jobbers are frozen. The order applies to all knitted, woven or braided elastic containing bare rubber core or covered rubber thread in any quality or in any condition whatsoever. Any elastic fabric which on June 20 had been packaged in the customary retail form, however, is exempt, but both the kind of packaging and the amount of the fabric must be different from the customary package used for distribution to processors, manufacturers or any person other than retailers or persons selling to retailers.

Specifically, no manufacturer or any other person may process, cut, change the form, attach, sew on, sell, deliver, purchase or accept any elastic except to

fill actual orders or contracts with the Army, Navy or specified Government agencies, or for use in the specified essential health and industrial articles permitted by the order.

Under the terms of Order M-174 as amended, each person who processes any elastic fabric must immediately submit to the Allocation and Appeals Section of the Textile, Clothing and Leather Branch of WPB the following: A sample not less than three feet long of each construction, width and color of elastic fabric he has in his inventory or under his control. In addition, he must show the cost price, total quantity and portion of such fabric required to fill actual military or Government orders or contracts. Furthermore, such information must accompany any appeals that may be made to WPB.

Under Order M-124 as amended (rubber yarn and elastic thread), each person, other than the Defense Supplies Corp. or its representatives, is required to report immediately to WPB the total poundage, manufacturer's style number, core size and kind of covering of each item of rubber yarn, latex yarn or elastic thread in his inventory or under his control. However, such yarn or thread which on March 29, 1942, was in retail merchants' stock is exempt.

Acting to expedite the sale of covered rubber thread needed for gas mask webbing, OPA issued Amendment 1 to Maximum Price Regulation 149 on September 9. Under the new amendment, manufacturers of covered rubber thread may contract with the Defense Supplies Corp. for delivery at the present maximum price levels with a provision for adjustment to a higher price in any case where OPA permits an increase in the maximum.

In view of the amendment, sellers may now meet the immediate needs of DSC for rubber thread and at the same time file a petition with OPA for a higher price. If OPA grants an increase, the difference between the original contract price and the new level would be paid on the amount delivered in the interim.

Camelback and Capping Stock

Specifications governing the manufacture of camelback and capping stock are contained in Amendment No. 14 to Order M-15-b-1, issued by WPB on August 24. The amendment, reproduced in full on page 523, also revises the specifications governing the manufacture of passenger car, truck and agricultural implement tires and tubes.

The section pertaining to camelback, designated as List 18, prohibits the manufacture of any size or type of camelback or capping stock other than sizes and types included in the order unless special authorization is issued by the Director General for Operations. The order provides for gauges of 10/32, 12/32, 14/32, 16/32, 18/32, 20/32, 22/32 inches and larger only.

According to the new amendment, heavy-duty camelback and capping stock designed for use on mileage bus tires or rock service tires of a cross-section of 8.25 inches or more may be manufactured from Grade A compounds, while airplane tire stock may be manufactured from compounds up to and including Grade A. Ordinary truck-type camelback and capping stock may be manufactured from Grade C compounds only while passenger-type stock can use Grade F compounds only.

Rubber-Covered Rolls

Specifications for the manufacture of rubber-covered rolls (except washing machine wringer, printer, finger print and business machine rolls) are provided in Amendment No. 15 to Order M-15-b-1, issued by WPB on August 15. The specifications are designed to save an estimated 25,000 pounds of rubber per month. They require the use of less rubber in the compounds.

The order provides for six rubber compounds and two synthetic rubber compounds and specifically covers rubber-covered rolls used in the paper, textile and tanning industries, as well as rolls used in steel mills. Like other specification orders, the maximum percent by volume of crude rubber and the total rubber hydrocarbon content per compound are specified.

Rubberized Fabric

Under the terms of Amendment No. 16 to Order M-15-b-1, issued by WPB on September 1, neither crude rubber or latex can be used in the manufacture of rubberized fabric for protective clothing. The amendment contains specifications eliminating such use. Crude rubber, however, may be used in cements or tapes necessary for seaming purposes.

These new specifications apply to war orders and orders placed by any agency of the Government as well as to civilian orders. The restrictions, however, do not apply to the following: (1) Rubber life saving suits designed for use by seamen; (2) Aviation waders, self-inflating life preservers, dual tube belts and ponchos when required to fill war orders; (3) Commercial diving equipment; (4) Raincoats and parkas scheduled for delivery to or for the account of the U. S. Navy at any time prior to October 1, under delivery schedules or purchase orders in existence on August 1.

Rubber Footwear

Amendment 2 to Maximum Price Regulation 132, issued by OPA on August 24, sets maximum manufacturer's prices for new types of waterproof footwear which WPB will permit to be manufactured to take the place of other kinds with larger crude rubber content. In all, eleven new types of footwear were added to the schedule, most of which are being made with substitute materials to conserve crude rubber, and some of which are being made with a veneer of neoprene or other synthetic rubber for use by men working in oils and fats which are harmful to rubber.

The new amendment, which sets the prices for the new items at levels commensurate with others in the same schedule, also establishes the amounts that may be charged, over the regular ceiling levels, for rubber footwear constructed in such a way that its life can be prolonged by replacement of a stitched outsole. A provision for additional charges for hobnails and toe and heel cleats which make special occupational articles and boots wear longer is also included.

Rubber Heels

Conditions under which transportation costs may be added to the maximum prices for rubber heels sold to shoe repairmen are contained in Amendment No. 1 to Maximum Price Regulation 200, issued by OPA on August 31. Both the regulation and the amendment were effective September 1.

The price to the repairman may exceed the ceiling by the amount necessary to include the same proportion of transportation charges as the seller required buyers of the same class to pay during March, 1942, according to the amendment. Thus, if the repairman was charged all of the transportation cost in March, the seller in making sales to the same customer or one in the same class may add the total transportation cost to the ceiling price as set forth in the schedule covering rubber heels.

However, if the jobber delivered rubber heels free of transportation charges to the shoe repairman in March, 1942, he must continue this practice and may not add transportation cost to the present ceiling prices.

According to a ruling announced by the Consumer Division of OPA on August 30 all heels made after September 1 will be designated as V-1, V-2, V-3 or V-4 and must be marked accordingly. This ruling does not apply to toplifts for women's high-heeled shoes because the small surface area leaves no room for the V-grade mark and some other means of identification is being worked out.

The heels will be black only and the "V" designation will indicate the quality of the reclaim used, reclaim being the only rubber which may be used in the manufacture of the heels. V-1 represents the highest grade and must meet definite specifications for abrasion and tensile strength. The manufacture of heels inferior to the V-4 grade has been prohibited.

OPA has placed price ceilings over each of the four grades of Victory heels. In general, they are based on prices charged by shoe repairmen last March, the base period for most price ceilings, and include the service charge for attaching the heels to the shoes. Women's Cuban heels and junior wedges will cost from 30 cents to 40 cents, for example; men's half heels, 40 to 55 cents, and men's whole heels, 45 to 65 cents.

INTERESTING DEVELOPMENTS IN SYNTHETIC RUBBER SITUATION

According to an announcement made on August 18 by W. B. Plummer, president of Rubber Synthetics, Inc., the synthetic rubber project at Gary, Indiana, has been deferred "as sufficient supplies of butadiene have been developed in other parts of the country, using existing equipment or by modification of plants already under construction." The company, organized by Standard Oil (Indiana), Sinclair Refining and Cities Service, had been authorized to build a plant for the manufacture of butadiene at Gary and a boiler and power house and cooling water system large enough to take care of the requirements of that plant as well as plants for the production of styrene and Buna S, itself, also planned for construction in the same locality.

The entire project at Gary was estimated to have cost approximately $90,000,000. Cancellation of the project, therefore, it was pointed out, would result in a substantial saving in the cost and critical material requirements of the national rubber program. It was also estimated that approximately $3,500,000 had already been expended on the Gary project, including the job of clearing and draining some 900 acres, preliminary to the erection of the plants themselves.

DuPont May Make Thiokol

If negotiations now being conducted between officials of the Thiokol Corporation and E. I. du Pont de Nemours & Co., Inc., are favorable to both concerns, there is a good likelihood that DuPont may soon begin the production of Thiokol N, probably for the Thiokol Corp.

Under existing conditions DuPont is no longer manufacturing tetraethyl lead and the facilities formerly used to manufacture that material may well be converted to the production of Thiokol. The chlorination of hydrocarbons, which essentially is the story of Thiokol production, runs along paths somewhat similar to those used in the production of tetraethyl lead. Both are polymerization processes.

Although it is too early at this writing to make any predictions, it seems quite likely that if the pending deal goes through DuPont would produce about 30,000 tons of Thiokol N per year, thus matching the production facilities planned by Dow Chemical and approved by WPB. Thus, there would be a total of 60,000 tons of Thiokol N available for retreading and recapping purposes.

Alcohol from Sulphite Liquor

One interesting note injected into the synthetic rubber haze this past month was the announcement by the Ontario Paper Company that it has applied to WPB for priorities on distilling apparatus through which rubber will be made from a paper mill by-product. The company informed WPB that it would finance construction of facilities necessary to convert sulphite liquor—the waste product—into alcohol from which butadiene can be made. Further, it offered to make the process available to other mills.

Ontario Paper estimates that the sulphite liquor which is drawn off in the production of wood pulp paper is available in sufficient quantities in the United States and Canada to make 90,000 tons of synthetic rubber annually, or approximately 10% of the present planned quantity.

Farish Challenges New Charges

In answering charges raised before the Senate Patents Committee early last month, as reported in the previous issue, W. S. Farish, president of the Standard Oil Co. (N. J.), in a hearing before that committee on August 19, declared that the United States has benefited far more than Germany from working agreements between Standard Oil and I. G. Farbenindustrie, the German chemical trust. He stated that testimony to a different effect taken before the committee was a "jerry built house" based upon misrepresentations.

In a long statement, on which he was continually interrupted, Mr. Farish asserted that "not one disinterested witness with competent knowledge" had been called to testify in the matter and that statements made by officials of the Department of Justice were "based upon misrepresentations of contracts, bolstered up by selected paragraphs, memoranda, and letters from our files."

Mr. Farish traced the relations between Standard Oil and Farbenindustrie and repeated his previous claims that the contracts between the two concerns made possible the development of Buna in the United States as well as Butyl rubber, Vistanex and now Flexon. He pointed out that Butyl rubber has not been and cannot be made on a large scale except as part of an oil business. He also referred to the fact that Standard Oil had submitted samples of various types of Buna to Government agencies on 46 separate occasions in the two-and-a-half years before Pearl Harbor.

Testifying before the same committee on August 20, Willard C. Asbury, a Standard Oil technician, argued that the Farbenindustrie agreements have benefited the United States materially by making possible early development of many new products—including Butyl rubber and Flexon—which otherwise would have required many years of experimentation. The work done by Farbenindustrie, he said, inspired Standard Oil to begin experiments which Government officials expect will produce synthetic rubber tires for civilians next year.

SYNTHETIC RUBBER PROGRAM

(As of July 17, 1942)

The following data on contracts let to date for the butadiene, styrene and polymerization plants in the Government's synthetic rubber program is based on information recently released by the Rubber Reserve Co.

Name	*Production Capacity In Short Tons Per Year*	*Completion Date*	
Butadiene Plants			
Shell Chemical ...	30,000	Mar.,	1943
So. Calif. Gas	25,000	Jan.,	1943
Humble Oil	30,000	Mar.,	1943
Standard Oil (La.)	6,200	Sept.,	1942
Standard Oil (La.)	15,000	Mar.,	1943
Carbide & Carbon .	5,000	Sept.,	1942
Carbide & Carbon .	20,000	Jan.,	1943
Carbide & Carbon .	20,000	Feb.,	1943
Carbide & Carbon .	20,000	Mar.,	1943
Carbide & Carbon .	20,000	Apr.,	1943
Carbide & Carbon .	20,000	Apr.,	1943
Carbide & Carbon .	20,000	May,	1943
Carbide & Carbon .	20,000	June,	1943
Carbide & Carbon .	20,000	May,	1943
Carbide & Carbon .	20,000	June,	1943
Carbide & Carbon .	20,000	July,	1943
Atlas Oil & Ref. ..	12,000	Nov.,	1942
Neches Butane ...	50,000	Apr.,	1943
Neches Butane ...	50,000	June,	1943
Rubber Synthetics .	50,000	June,	1943
Rubber Synthetics .	50,000	Aug.,	1943
Koppers United ..	20,000	Aug.,	1943
Sinclair Rubber ..	50,000	Oct.,	1943
Cities Service	55,000	Aug.,	1943
Total	648,200		
Styrene Plants			
Dow Chemical	25,000	Mar.,	1943
Monsanto	10,000	Oct.,	1942
Monsanto	10,000	Jan.,	1943
Monsanto	10,000	Feb.,	1943
Monsanto	5,000	Mar.,	1943
Carbide & Carbon .	12,500	Jan.,	1943
Carbide & Carbon .	12,500	Apr.,	1943
Dow Chemical ...	4,200	Jan.,	1943
Dow Chemical ...	25,000	Apr.,	1943
Dow Chemical ...	25,000	June,	1943
Dow Chemical ...	25,000	June,	1943
Dow Chemical ...	12,500	Aug.,	1943
Koppers United ..	35,000	Aug.,	1943
Total	211,700		
Copolymer Plants			
Firestone	30,000	Feb.,	1943
Firestone	15,000	June,	1942
Firestone	15,000	Sept.,	1942
Firestone	15,000	June,	1943
Firestone	15,000	July,	1943
Firestone	15,000	Aug.,	1943
Firestone	60,000	Aug.,	1943
Goodyear	15,000	May,	1942
Goodyear	15,000	Aug.,	1942
Goodyear	30,000	June,	1943
Goodyear	30,000	Apr.,	1943
Goodyear	15,000	May,	1943
Goodyear	10,000	June,	1943
Goodyear	55,000	Oct.,	1943
Goodrich	30,000	Nov.,	1942
Goodrich	30,000	Jan.,	1943
Goodrich	30,000	Apr.,	1943
Goodrich	15,000	May,	1943
Goodrich	10,000	June,	1943
U. S. Rubber	30,000	Jan.,	1943
U. S. Rubber	30,000	Mar.,	1943
U. S. Rubber	30,000	May,	1943
U. S. Rubber	15,000	Aug.,	1942
U. S. Rubber	15,000	Nov.,	1942
U. S. Rubber	15,000	June,	1943
U. S. Rubber	15,000	July,	1943
U. S. Rubber	15,000	Aug.,	1943
Open	30,000	June,	1943
Open	30,000	June,	1943
Open	25,000	Aug.,	1943
Total	700,000		
Butyl Plants			
Standard Oil (La.)	7,000	Nov.,	1942
Standard Oil (La.)	33,000	July,	1943
Humble Oil	20,000	July,	1943
	60,000*		
Neoprene Plants			
duPont	10,000	Oct.,	1942
duPont	10,000	Apr.	1943
duPont	20,000	Oct.,	1943
Total	40,000		

** Recently boosted to 132,000 tons by expanding existing plants.*

Miscellaneous Data on Synthetics

An appeal to all contractors in the fields of synthetic rubber plant construction, oil refineries and power plant construction, to use, insofar as possible, only equipment of standard design was issued by WPB on August 18. Howard Coonley, Chief of the Simplifications Branch of the Conservation Division, in letters sent to 36 designers of such plants, pointed out that almost all materials used in such construction are on the critical list.

According to Mr. Coonley, a preliminary survey has indicated that the inclusion in these installations of special designs would substantially retard production in what he termed the "bottleneck" industries. He also stated that the war effort may compel the Government to prohibit the production of "specials" but intimated that if the suggestion to use standard equipment was followed such a step would be unnecessary.

An encouraging note on the synthetic rubber situation was sounded by Charles Kettering, vice-president in charge of research for General Motors, in a statement issued on August 29. He said that before the war is over this country will be producing synthetic rubber as good or better than natural rubber and that production of the synthetics will not be long delayed. He foresaw approximately 18 months or two years of shortage during which civilian tires will have to be kept running by means of Thiokol or similar substitutes.

A new rubber-like material is reported to have been developed by technicians of the Wooster Rubber Co., Wooster, Ohio. According to the company, its process entails the combining by vulcanization of resins found in Latin America with synthetic resins produced in this country. The flexibility of the finished product is said to be unusually good. WPB has been advised of the process which, according to Wooster officials, can produce 7,000 to 10,000 tons of rubber-like material at the Wooster plant alone annually.

BUTADIENE

A program for conversion of existing oil refinery equipment for the manufacture of butadiene and other basic raw materials for synthetic rubber, as well as for the manufacture of aviation gasoline, explosives and other war-essential products, was announced by the Office of the Petroleum Coordinator on August 17. The program is designed to increase production of these vital war products without tapping the supply of critical materials.

In announcing the program, Ralph K. Davis, Deputy Petroleum Coordinator, stated that in addition to the advantage of increased production through the use of old equipment, it will make it possible for a considerable number of small operators to get into the war production program. Participants in the program were urged to make their own selection of the processes they propose to use, with the OPC offering to criticize any plans submitted and to make recommendations for improvements. The specifics of the procedure were made public and are available from the headquarters of the OPC in Washington, D. C.

To Use Houdry Process

The Defense Plants Corporation is reported to have authorized the Sun Oil Company to convert part of its Toledo, Ohio, refinery to the manufacture of butadiene using the Houdry Process. This process, developed by Eugene J. Houdry of the Houdry Process Corp., Philadelphia, is a catalytic process for the extraction of butadiene from petroleum and has been the subject of considerable discussion in recent months.

According to the report, facilities will be provided at Toledo to produce 15,000 tons of butadiene annually, enough to manufacture approximately 19,000 tons of rubber. Production is expected to begin early next year. Sun Oil is a licensee of the Houdry Process Corp.

DEVELOPMENTS IN CRUDE RUBBER, GUAYULE AND SCRAP RUBBER

Agreements calling for the exclusive purchase by the Rubber Reserve Co. of all rubber above that needed for domestic use have been signed with five more Latin American countries—British Guiana, British Honduras, Trinidad, El Salvador and Guatemala. This brings to twelve the number of such agreements, previous ones having been signed with Brazil, Peru, Nicaragua, Costa Rica, Colombia, Bolivia and Ecuador. Like the previous agreements, the new ones cover a five year period and provide for financial assistance from the United States to develop rubber resources.

While it is true that most of the South and Central American countries involved in these agreements have not been producing any great quantities of rubber, belief has been expressed that large supplies will be available once development gets under way, particularly in Ecuador and Bolivia. Great hopes are also expressed for Colombia, for which a plan for the opening of millions of square miles of virgin rubber tracts has been advanced by agents of Rubber Reserve.

The territory which would be opened for exploitation under this plan is located in Eastern Colombia, a vast triangle covering almost half of that country's area. Most of this territory has never been explored by white men. Negotiations are currently under way with officials of Avianca Airlines for the construction of landing fields in the jungles to take out the rubber, since with present transportation methods it takes at least two months to reach the most accessible parts near the Brazilian border.

A preliminary survey has disclosed that the great jungle area in Eastern Colombia has untold quantities of rubber but exploitation has been retarded by absence of transportation, limited chiefly to rivers. With rubber stations scattered throughout the jungle it is believed contractors could gather great quantities of rubber from the natives and then have it flown to export ports. The project, if approved, would be largely financed with American capital.

Encouraging reports on the crude rubber situation continue to reach officials concerned with the problem in this country. The finding of at least 50,000 rubber trees of the Castilla type in the State of Yaracuy in Venezuela has been reported by Robert J. Hines, a botanist employed by the Venezuelan Ministry of Agriculture. He stated that the trees were located in accessible regions and could be easily exploited by experienced rubber gatherers.

From Africa comes the report that the Government of the Union of South Africa is investigating the native rubber resources of the Union, with special emphasis placed on rubber from *Euphorbia* trees, which are numerous in the region. *Euphorbia* rubber has long been known but price conditions have always prevented its widespread exploitation. When exposed to air the latex of *Euphorbia* forms a gummy substance which on a dry basis contains about 80% resin and about 16% actual rubber. The resin, too, finds commercial application.

A drive to speed up rubber production in Tanganyika has been launched by the government of that country with the publication of special control measures designed to insure supplies of the highest quantity and quality. Rubber has been given priority over all other products in the territory. The work of clearing over 10,000 acres of rubber plantations which have been mostly derelict for the past 30 years is moving along rapidly. A special purchasing agent for wild rubber has been appointed by the Ministry of Supply.

Growing interest in the rubber producing potentialities of Mozambique, the Portuguese colony on the southeastern coast of Africa, has also been reported. Two possible sources of rubber which were cited as attracting interest are *Euphorbia* and *Lanolphia*, the latter more popularly known as "kafir orange." Both of these varieties are found in abundance.

GUAYULE

According to a letter received from Major Evan W. Kelley, director of the Guayule Emergency Rubber Project for the Department of Agriculture, the 530 acres of nurseries sowed with the 23,000 pounds of guayule seed acquired by the Government from the Intercontinental Rubber Co. are producing a good crop of seedlings. The plants have made fine growth and losses have been very moderate. The project expects to harvest about 350,000,000 useable plants beginning in October, enough to plant some 32,000 acres of field plantations.

Seed collection has gone even beyond the wildest hopes. More than 100,000 pounds, clean weight, have already been collected and more will be collected a little later on when the fields planted last spring ripen their seed. This happy circumstance comes about partly because of an extraordinarily fine seed crop and partly by virtue of the fact that the mechanical picker was abandoned and the seed was collected by hand. The machine is cheaper, reports Major Kelley, but necessarily wastes a good part of the seed.

Planting of the present crop of stock will be done this fall and winter. If the present statutory limitation of 75,000 acres is lifted (this limit is set in the Guayule Bill approved by Congress and the President), the project is in a position to establish winter nurseries in the southern part of California, seed them with seed collected this summer, and have additional stock ready for planting next spring. If the limitation is not lifted, the project would not be justified in constructing more nurseries, according to Major Kelley, since the present nurseries are adequate to maintain the authorized acreage though with the loss of one growing season for part of the total.

Among the properties the Emergency Guayule Rubber Project acquired from the Intercontinental Rubber Co. is some 500 acres of mature guayule which tests indicate contains something better than a million pounds of rubber. This may be processed this fall if it is not considered expedient to hold it for further seed production.

Word was also received during the past month that the mounting demand for guayule has led to the doubling of the productive capacity of Cia Hulera de Parras which operates an extraction plant at Parras, Mexico. The announcement was made by the American Cyanamid & Chemical Corp., New York City, representatives of the Mexican concern.

In its announcement, American Cyanamid pointed out that the present rapid extension of the use of guayule is based in part on the improved properties which it imparts to synthetic rubbers, particularly of the Buna S type, when the guayule contains its original resin content. It increases the tack of the synthetics, an important property in working them.

Dr. E. W. Brandes of the Bureau of Plant Industry of the Department of Agriculture, revealed last month that *Kok-Sagyz* seeds, recently received from Russia, have already been sent to Argentina and Chile for experimental plantings. He also stated that the guayule bush and *cryptostegia grandiflora,* the bush vine, had been introduced throughout Latin America, including plantings in Brazil and Peru.

SCRAP RUBBER

Considerable concern over the fire hazard represented by the piles of scrap rubber collected during the recent nation-wide scrap rubber salvage campaign was expressed last month by the National Fire Protection Association. The Association in its August News Letter pointed out that these stockpiles may ignite spontaneously due to the presence of oily materials.

According to the Association, the original plan was to store quantities of as much as 20,000 tons in vacant lots in and around some twenty cities, but subsequent consideration of the problem by Rubber Reserve resulted in a decision to have a maximum of 10,000 tons in one location, with average quantities somewhat less. Transportation difficulties increased the problem.

Under the latest plan, additional sites are being acquired to permit further dispersion of the storage. It also contemplates subdivision of storage into piles 50 by 100 feet by 15 feet high, separated by 50 foot aisles, thus limiting the total fire loss in one pile to somewhere between 1,000,000 and 2,000,000 pounds. Where the entire capacity of a lot is not utilized, piling will be in alternate pattern to maintain 150 foot clearance which should considerably reduce the danger of fire spreading from pile to pile. This storage is of course temporary and stocks will be moved to reclaiming plants as quickly as possible.

It was learned that the Army, through the Office of the Provost Marshall General, entered the discussions between the Association and Rubber Reserve, expressing a preference that the scrap rubber stockpiles be maintained in relatively large units which could be effectively guarded against sabotage rather than wide dispersion which would make adequate guarding difficult. It is possible that watch towers will be erected in some storage lots to permit a limited number of guards to supervise a fairly large area, thus permitting storage of a given quantity of rubber in smaller piles more widely spaced.

TIRE RATIONING IS TO BE SHARPLY CURTAILED IN FUTURE

In accordance with the warning issued by OPA on August 21 that tire quotas will have to be drastically reduced during the remaining months of 1942 in order to stay within the amount of rubber earmarked for the purpose, sharply reduced tire and tube quotas were instituted for September. The reductions applied to all classifications with the exception of Grade 2 passenger tires, which are available only to war workers who qualify under a special provision in the regulations.

September quota for new truck tires for the states and territories is 239,445, compared with 316,695 for August, while the quota for recapped tires and recapping services is 262,258 compared with 355,883. The inner tube allotment is 262,261 compared with 347,696.

Passenger car tire allotments are 38,297 new tires for applicants on List A, which includes the most essential services; 115,544 Grade 2 tires; 486,468 recapped tires or recapping services, and 33,450 inner tubes. August quotas were 58,308 new tires for List A, 87,860 Grade 2, 637,959 recaps and 418,910 tubes.

Although the reduced allocation follows a seasonal pattern of prior years when truck tire use tapered in the fall and winter months, it comes at a time when war production and kindred activities are keeping many heavy vehicles at work night and day. It was to provide tires for these and other essential trucks that OPA late in July made a change in its rationing regulations which will result in denying tires to an estimated 200,000 vehicles carrying alcoholic beverages, soft drinks, candies, furs and other luxury goods.

During the past five months when quotas have been increased monthly to take care of additional requirements during the hot months, some local boards have followed a practice of carrying over unfilled applications from one month in anticipation of a larger quota in the next. With the trend now scheduled for reversal, however, OPA urged that each application be considered in light of each month's quota.

New Amendments Issued

Two new amendments to the Revised Tire Rationing Regulations have been issued by OPA since our last report, as follows:

Under the terms of Amendment No. 24, issued on August 17, any manufacturer or dealer in camelback may now transfer this material without certificate for use on tires owned by the Army or to any retreader or recapper who either has a prime contract with the War Department or a subcontract with any prime contractor. Duplicate purchase orders showing number or identification of the prime contract must be

made out to cover the transfers and monthly reports filed.

Amendment No. 25, issued on August 25, adds to the List A eligibility classification any vehicle, required because of the absence of other practicable means of transportation, used exclusively by "a regularly practicing minister of any religious faith who serves a congregation and who uses the vehicle exclusively to meet the religious needs of the locality which he regularly serves" or "a religious practitioner, other than a minister, who is duly authorized by an organized religious faith to render services of a religious nature to its members."

Standard on Retreading

Based on hundreds of protests received by various Government agencies against the use of different qualities and sizes of retreads prevailing in different cities and states, the National Bureau of Standards has devised a commercial standard for the retreading of tires. Producers, distributors and users of automobile and truck retreading materials were invited to Washington on September 16 at which time the standard developed by the Bureau will be offered for their approval.

The proposed standard was submitted by the Bureau to the National Institute of Treading Standards. It includes preliminary revision based on suggestions received from retreaders and from manufacturers of camelback and retreading equipment. Further changes as a result of recommendations and discussions at the conference called in Washington are expected to be made. Further details on the proposed standard can be secured from F. W. Reynolds, Division of Trade Standards, National Bureau of Standards, Washington, D. C.

MISCELLANEOUS

To provide adequate supplies for military needs of several important cyanamid derivatives not covered by G.P.O. M-165, WPB issued Amendment No. 1 to that order on September 1. Guanidine, widely used in rubber accelerators, is one of the derivatives covered.

General Preference Order M-142 was amended on September 8 to bring the naphthenates under complete allocation and to continue allocation control of naphthenic acid. Naphthenates are finding increasing use as softeners and plasticizers for synthetics and reclaim.

Dichloroethyl ether, urgently needed for the purification of butadiene, was placed under complete allocation on September 5 by the issuance of G.P.O. M-226. Allocation and use control was deemed necessary to prevent diversion of present supply to non-essential uses.

Furfural, which is now of special importance in manufacturing butadiene for synthetic rubber, was placed under complete allocation and use control by G.P.O. M-224, issued on September 5.

WANTED:
A New Name for Buna S

The bulk of the Government's synthetic rubber program will consist of the butadiene-styrene copolymer now known as Buna S. The word "Buna" is of German derivation, comprising the first two letters of butadiene and the chemical symbol for sodium. The opinion has been expressed by leading rubber technologists and also by the Rubber Branch of WPB that it is highly desirable to rename this copolymer—not only because of the origin of the present name but because our American product is not the same material as that used in Germany.

Accordingly, the entire rubber industry has been invited to submit suggestions for a new name, one which may be derived from the basic materials used in the production of the copolymer or one which has no relation whatsoever to such materials. The name, however, should be short, euphonious, and easy to grasp by both the layman and the rubber technician. Submit your suggestions to The Editor, RUBBER AGE, 250 West 57th St., New York City, and we will see to it that they reach the proper authorities.

To meet the synthetic rubber program, new furfural production facilities capable of producing 24,000,000 pounds a year are being built by the Defense Plants Corp.

EDUCATIONAL PROGRAM

The new educational section of WPB's Rubber Branch, recently organized with Dr. H. E. Simmons, of Akron University, as its head, assisted by John Ball, formerly of the R. T. Vanderbilt Co., got off to a flying start last month with a series of meetings held with various branches of the industry. The purpose of the new section is the widespread dissemination of information on the compounding and processing of synthetic rubbers, particularly Buna S. Meetings have already been held with representatives from the drug sundries, mechanical goods and tire branches of the industry, as well as with representatives of the leading suppliers of rubber chemicals and compounding ingredients. Dr. Simmons is Associate Chief of the Rubber Branch.

The entire cooperation of the rubber industry in the overall war job to be done is invited by Dr. Simmons. Suppliers and manufacturers alike are urged to report the results of any investigations undertaken in connection with synthetic rubber to the new educational section so that it may be correlated with other work being reported and be reissued to the entire industry. Only cooperation of this kind will bring to an earlier conclusion the answer to some of the problems now existant in the compounding and processing of synthetic rubber. Quantities of any of the synthetic rubbers in lots of 200 pounds or less per month can be secured from the Rubber Reserve Co. without allocation certificates.

One of the major aims of the educational section is the preparation and issuance of a number of bulletins designed to aid compounders working with the synthetics. The first of these, covering the testing and compounding of Buna S, has already been received and distributed to most rubber manufacturers. Copies of this and subsequent bulletins can be secured by writing to John Ball, Rubber Branch, War Production Board, Railroad Retirement Building, Washington, D. C. Since practically all manufacturers will sooner or later be placed in the position of having to use the synthetics, exclusively in most cases, the work of the new section is extremely timely and essential.

EXPORT REGULATIONS

As allocations of rubber among the various other American republics have been established, all exporters of rubber and rubber products will be required to obtain certificates of necessity from the appropriate agencies in the country of destination, the Office of Exports announced on September 1.

However, the B. E. W. will continue to issue licenses, despite the absence of such certificates, until September 30 in unusual cases where "extreme hardship would result from rejection of the license application," according to Controls Bulletin 44.

Commodities subject to the rubber allocations include: Crude rubber, reclaimed rubber, scrap rubber, synthetic rubber and rubber manufactures, whether such manufactures contain crude, reclaimed or synthetic rubber. These commodities have been added to the list of allocated materials, but the provisions of War Production Board General Export Order M-148 are not applicable, it was explained.

Shipments of rubber hose, tubing, belts and belting in the form of aircraft replacement parts are not considered as shipments of rubber, it was said. Such articles are treated as aircraft parts under the appropriate schedule B number.

Rubber manufactures in the form of component parts of a finished article (such as rubber washers in a pump, or a rubber fan belt in an automobile) are not included in the rubber restrictions, but are considered with the finished article. This applies also where complete machines are shipped in a knock-down or unassembled condition.

DIGEST OF THE BARUCH COMMITTEE REPORT ON RUBBER

Mr. President:

Herewith is presented a digest of the full report of the committee you appointed on August 6, with instructions that the survey "include not only facts with respect to existing supplies and estimates as to future needs, but also the question of the best method to be followed for obtaining an adequate supply of rubber for our military and essential civilian requirements. * * * To recommend such action as will best produce the synthetic rubber necessary for our total war effort, including essential civilian use, with the minimum interference with the production of other weapons of war."

Existing Situation is Dangerous

We find the existing situation to be so dangerous that unless corrective measures are taken immediately this country will face both a military and civilian collapse. The naked facts present a warning that dare not be ignored. We present herewith the significant figures:

Crude rubber position of the United States (July 1, 1942, to January 1, 1944): On hand July 1, 1942 (stock pile), 578,000 tons; estimated imports July 1, 1942, to January 1, 1944, 53,000 tons; total crude rubber, 631,000 tons.

Estimated military and other essential demands July 1, 1942, to January 1, 1944, with no allowance for tires for passenger automobiles: 842,000 tons.

Deficit that must be met by production of synthetic rubber before January 1, 1944: 211,000 tons.

Unless adequate new supplies (natural or artificial) can be obtained in time, the total military and export requirements alone will exhaust our crude stocks before the end of next summer.

Tires on civilian cars are wearing down at a rate eight times greater than they are being replaced. If this rate continues, by far the larger number of cars will be off the road next year and in 1944 there will be an all but complete collapse of the 27,000,000 passenger cars in America.

We are faced with certainties as to demands; with grave insecurity as to supply. Therefore, this committee conceives its first duty to be the maintenance of a rubber reserve that will keep our armed forces fighting and our essential civilian wheels turning. This can best be done by "bulling through" the present gigantic synthetic program and by safeguarding jealously every ounce of rubber in the country.

At the same time we find that rubber for necessitous civilian use has been insufficiently allocated. More must be allowed for tire replacement and recapping. That is part of the conservation program we submit. More rubber use to those who need it; less to those who don't!

Let there be no doubt that only actual needs, not fancied wants, can, or should, be satisfied. To dissipate our stocks of rubber is to destroy one of our chief weapons of war. We have the choice! Discomfort or defeat. There is no middle course.

Therefore, we recommend:

That no speed above 35 miles an hour be permitted for passenger cars and trucks. (In this way the life of tires will be prolonged by nearly 40 per cent.)

That the annual average mileage per car now estimated as 6,700 be held down to 5,000, a reduction of 25 per cent. (This does not mean that each has a right to 5,000 miles, it applies to necessary driving.)

That more rubber than is now given to the public be released to fully maintain, by recapping or new tires, necessary civilian driving.

That a new rationing system of gasoline be devised, based on this 5,000 miles a year to save tires.

That the restrictions as to gasoline and mileage be national in their application.

That compulsory periodic tire inspection be instituted.

That a voluntary tire conservation program be put into effect until gasoline rationing can be established.

Gas rationing is the only way of saving rubber. Every way of avoiding this method was explored, but it was found to be inescapable. This must be kept in mind: The limitation in the use of gasoline is not due to shortage of that commodity—it is wholly a measure of rubber saving. That is why the restriction is to be nation-wide. Any localized measure would be unfair and futile.

This note of optimism is permissible: If the synthetic program herein outlined will fulfill reasonable expectancy, it may be possible to lessen this curtailment before the end of 1943. But until then, any relaxation is a service to the enemy.

Country Dependent on Synthetics

In answering the questions of how much rubber do we have and where are we going to get more, the country is dependent, finally, upon the production of synthetic rubber which, it is hoped, will reach its full swing in 1944.

Why not earlier? Why so late? The answers to these queries lie in the past. These errors, growing out of procrastinations, indecisions, conflict of authority, clashes of personalities, lack of understanding, delays, and early non-use of known alcohol processes, are not to be recounted by us, nor shall we go into the failure to build a greater stockpile of crude rubber. We are concerned with the past record only in so far as it has seemed to us to cast light on problems of future administration.

To prevent a recurrence of these mistakes, this committee asks an immediate reorganization in present method and the creation of a rubber administrator. This official will have authority over the policies governing the priceless stock of rubber now on our automobiles, the drivers of which are trustees of our national safety. He will direct the course of the technical and industrial development—wholly new to America—of the synthetic rubber production.

If our hopes are realized, the production of Buna S and Neoprene (the two synthetic materials on which we now rely most to replace crude rubber) will total 425,000 tons by the end of 1943. But, on the other hand, the figure might easily fall to less than half that amount if delays occur—delays of as little as 120 days. "Bugs" may be found in plant construction or in the operation of any one of the three processes used in the manufacture of Buna S. With 425,000 tons we should have a margin of safety, a slight one, to be sure, perhaps 100,000 tons above necessary inventories for ourselves and our Allies—for the front. With only 200,000 tons of Buna S produced, our supplies would be exhausted. The successful operation of our mechanized army would be jeopardized.

Better to be Safe Than Sorry

We cannot afford to take a chance. It is better to be safe than to be sorry. We dare not depend upon unbuilt plants; upon increasing the reclamation of scrap; upon bringing the tire manufacturing capacity up to equal a theoretical synthetic production; upon other unproven factors.

The members of this committee have full faith in the ability of American industry to lick all these problems, but there is grave uncertainty as to time. Whatever our hopes, or even our reasonable estimates, until the synthetic rubber plants are operating at capacity, and beyond, we cannot take unnecessary risks. We cannot base military offensives on rubber we do not have. All our lives and freedoms are at stake in this war.

Until synthetic comes fully to hand, we recommend that sufficient reclaimed rubber, a small amount of crude, and an increased supply of Thiokol, or other substitutes, be made available for the tire replacement and recapping program, which we urge shall go into effect at once.

Perhaps, this should be said: Few believed that 90 per cent of our normal supply of crude rubber would be cut off when Pearl Harbor was attacked December 7. And only a few evaluated the situation correctly after that date!

There are almost as many estimates of future supplies—the rubber we do not have—as there are persons and agencies concerned in this problem. It is important to bear in mind that these are only estimates—based upon great intangibles.

How much rubber we shall get from South America, for example, depends on the shifting of nearly half a million natives into the Amazon Valley—it would be one of the great population movements of history—and on how many of them succumb to sickness and disease.

BARUCH REPORT (Cont'd)

It depends, too, on how successful we are in combating the menace of Hitler's underseas raiders.

No one can estimate with certainty the amount of scrap rubber in the United States. About 400,000 tons of scrap rubber were collected in the drive inaugurated by the President last June. This gathered scrap will yield about 300,000 tons of reclaimed rubber. It is true that nowhere near all of the scrap in the country has been collected. However, there already is on hand more than enough scrap to keep the entire reclaiming industry operating at capacity for many months. The committee is recommending measures to step up reclaiming operations to the fullest capacity and also a 20 per cent expansion of existing reclaiming facilities. Until that is done, the accumulation of huge scrap piles is an unnecessary fire and sabotage hazard which gives the committee much concern.

Roughly, a year will be required to increase reclaiming capacity appreciably. Too, reclaimed rubber is inferior to natural rubber, and its use as a substitute for crude is limited. So again, we find that in the final analysis we are basically dependent upon synthetic rubber.

Failure to Seek Russian Aid

Failure of the responsible officials to request the aid of Russia in setting up our synthetic system is a neglect for which we have not had a satisfactory explanation. The Soviet Republics have been first or second in the production of this commodity, and we are asking that their "know how" be obtained. The Soviet has expressed a willingness always to be co-operative. Russia has lost, through the German advance, between 50,000 and 60,000 tons of its rubber-making capacity.

Among other points to which the committee directs attention are:

Faulty flow of critical materials may block or delay plant construction.

No new synthetic processes are to be substituted for those approved.

That the present program must be expanded to 1,100,000 tons of all synthetics.

That the road rubber (rubber actually in tires now used on passenger cars and trucks) totals 1,000,000 tons.

In rubber, the United States must be listed as a "have not" nation.

Once we are secure in our position, we shall be freed from a source of worry that affects the high military and other governmental figures. We shall gain that position through sacrifices. There is no royal road to victory.

Herewith follows a digest of our findings and recommendations, and, as a separate document, our full report:

Digest:

Giving civilians more rubber.

All of the many witnesses who appeared before the committee urged the need for conserving the rubber now on automobiles. There was disagreement only on methods. The committee, however, has been concerned not only with reducing the use of rubber but with seeing that enough rubber is provided to maintain a minimum of necessary civilian driving. The committee does not believe in the doctrine of sacrifice for sacrifice's sake nor that workers should be expected to live in tents and farmers trudge miles to market unless our situation is so desperate that there is no alternative.

Our analysis of supply on hand and expected shows that at best only enough rubber can be made available for civilian use to maintain average mileage of vehicles at 5,000 miles a year. At present the annual average is estimated to be about 6,700 miles, which would mean that a further reduction of roughly 25 per cent in mileage is necessary. The 6,700-mile figure, in itself, is a reduction from the pre-war national average of about 9,000 miles a year. In good measure this voluntary conservation on the part of motorists is a reflection of the fear that when present tires are worn down no new tires will be available. Should this apprehension be relieved by an enlarged tire replacement program, without any other restriction, the committee fears that voluntary conservation would largely disappear, and the average mileage would shoot up. It would then take 250,000 tons of crude rubber a year to supply all cars with all the rubber they need. If additional rubber is to be made available to civilians, there must be sure control over rubber mileage. After analyzing every possible method, the committee finds the quickest, surest, and most convenient check is through the nation-wide rationing of the use of gasoline.

Rubber Rationing Program

Therefore, the committee recommends this five-point program of rubber rationing:

1. A reduction of the average mileage to a total not to exceed 5,000 miles per year by nation-wide rationing of gasoline.

2. Enlargement of the present tire replacement program to provide sufficient recaps and new tires for the maintenance of this minimum of essential driving, and to prolong to the utmost the useful life of tires now on the road.

3. Prompt and strict enforcement of a nation-wide speed limit not exceeding a maximum of thirty-five miles per hour for all passenger cars and trucks. Voluntary reduction to thirty miles will give substantially further mileage.

4. Compulsory periodic tire inspection.

5. An interim program of voluntary tire conservation until the rationing and inspection programs can be put into operation.

It must be kept in mind that we are not restricting the use of gasoline as such; we are rationing gasoline as the only effective measure to hold down tire use. To make the restriction other than nation-wide would be unfair and futile.

As part of this program, the committee recommends that sufficient reclaimed rubber, a small amount of crude and an increased supply of Thiokol or other substitutes be made available immediately for making new tires and retreads for civilian use. Thiokol is a rubber-like material which can be used to make retreads with an average life of about 5,000 miles. At present the production of 24,000 tons a year is planned. The committee recommends the expansion to 60,000 tons a year. With prompt action, this capacity can be provided by early 1943, and more than 50,000 tons produced next year. Thiokol retreads are serviceable only when driven at speeds under 40 miles an hour, which makes a rigid speed limit all the more imperative.

5,000-Mile Figure an Average

It must be clear that this program is not intended to give every citizen the right to drive 5,000 miles. This figure is an average which obviously means that the mileage allowed less essential drivers must be cut considerably below that amount to permit greater mileage for more essential drivers. The proper distribution of mileage to various drivers is a matter to be worked out by the responsible governmental agencies.

It should also be stated that, in the committee's judgment, even this indicated curtailment of driving will be insufficient to meet the situation unless there is an intensification of such conservation measures as car pooling and sharing of rides, and the purchase by the Government of extra tires and spares from persons who do not need them for resale to war workers, farmers, and others who do need them.

The committee has given careful consideration to the objections against the use of nation-wide gasoline rationing to conserve rubber. It realizes that real hardships will be caused many persons, and that some industries, communities and business pursuits will be particularly hard hit. However, the disadvantages are outweighed by the necessities for a sure, effective method for seeing that essential driving is maintained.

We are "a have not" nation.

Each time a motorist turns a wheel in unnecessary driving, he must realize that it is a turn of the wheel against our soldiers and in favor of Hitler.

The rubber rationing program proposed here should be considered as providing only a minimum of conservation and not as eliminating the need or value of the voluntary conservation measures now being practiced by many motorists.

The committee is confident that the American people, once acquainted with the uncertainties of our rubber supply, will gladly accept whatever conservation measures are necessary. If our supply situation is eased—and the expansion of the synthetic program that the committee is recommending holds out that hope—these conservation measures can later be relaxed somewhat. But until the soundness of the synthetic program has been fully demonstrated, and sufficient capacity is in actual production to meet

BARUCH REPORT (Cont'd)

all our military requirements, it is not safe to borrow, from the rubber we have, for any but the most essential of civilian needs.

When it comes to rubber, we are a "have not" nation. If we are to err, it must be on the side of sterner curtailment and conservation to anticipate the worst dangers that the war may bring.

While the committee has not sought to recount the mistakes of the past, it is concerned with the question of whether the present administrative organization is such as to insure the effective carrying through of the program. It is not.

Overlapping Authority Confusing

The committee finds a number of different Government agencies with overlapping and confusing authority over the synthetic rubber program. The conflict between the Rubber Reserve Company, a subsidiary of the Reconstruction Finance Corporation, and the Office of Petroleum Co-ordinator has delayed and complicated the bringing in of new facilities for the production of butadiene from oil. To make Buna S rubber, the synthetic around which the Government's program has been built primarily, three separate kinds of plants must be erected, for producing styrene, for producing butadiene, and for combining the two—polymerization is the technical term. At present the butadiene part of the program is lagging behind the styrene and polymerization capacity. Thus, any delay in getting the greatest possible butadiene production directly reduces the amount of synthetic rubber that will be produced.

The production of synthetic rubber represents an investment exceeding $600,000,000 and is one of the most complicated technical projects ever undertaken in this country. Yet, in none of the Government agencies has there been a clearly recognized group of independent experts to make the technical decisions. Reliance has been placed on one part-time technical adviser, aided by committees drawn from industry. This technical adviser has testified that on more than one occasion he requested the appointment of an adequate technical staff, in vain. The committee has found many evidences of procedures bordering on the chaotic in which non-technical men have made decisions without consulting with subordinates nominally in the positions of responsibility.

There have been many adjustments and readjustments in the synthetic rubber program. Some of these were inevitable. Some appear to be the result of bad administration.

One example of inexplicable administration that we can mention is the failure to obtain detailed technical information concerning the experience of Soviet Russia in making synthetic rubber. Russia has been manufacturing synthetic rubber successfully for more than ten years. Had the offer of the Soviet Government made in February to exchange full information been accepted, it is conceivable that plants for producing synthetic rubber by the Russian processes might well be on the way to completion. To date we have no detailed information as to the Russian experience, nor analysis of Russian tires. We feel this information should still be obtained.

One of the more critical battles that must be won is in the compounding of synthetic rubber. Synthetic rubber requires more time and effort to fabricate into tires—about one-third less in efficiency is reported. While tires for light passenger cars can be made entirely out of Buna S rubber, thus far in the manufacture of combat and heavy duty tires, which represent about 70 per cent of the Army's requirements, a good percentage of crude natural rubber must still be used. As long as crude rubber must be mixed with Buna S, we do not dare cut too deeply into our stocks of crude rubber—a minimum carryover into 1944 of 100,000 tons is vital.

However, the dissemination of technical information on the compounding of Buna S to all rubber companies has become an accomplished fact only in the last few days. On July 3 of this year an agreement was entered into between the Rubber Reserve Co. and four large rubber companies, by which Rubber Reserve alone was permitted to give out information on compounding to other companies. It took six weeks of repeated effort for the Rubber Branch of the War Production Board, desiring to launch a program of education throughout the industry, to get this vital information released by the Rubber Reserve.

Complete Reorganization Recommended

We recommend a complete reorganization and consolidation of the governmental agencies concerned with the rubber program. These changes should include:

(a) A directive by the President ordering the Rubber Reserve Co. and all other Government agencies to act in all matters relative to the rubber program as directed by the chairman of the War Production Board.

(b) The apointment by the chairman of the War Production Board of a rubber administrator, delegating to him full and complete authority in all matters related to rubber, including research, development, construction and operation of plants. The chairman of the WPB should divest himself of all direct concern with these matters.

(c) Establishment of an adequate technical staff, properly staffed under the immediate supervision of the rubber administrator, funds to be provided for these purposes.

That the Petroleum Co-ordinator be directed by Presidential order to act on specific directives from the rubber administrator to explore all methods for the production of butadiene from petroleum and natural gas products and to recommend new proposals to the rubber administrator for consideration and action. However, to make certain there are no construction delays because of conflicting authority the construction of all plants and equipment concerned with the production and purification of butadiene from oil shall be under the direction of the rubber administrator. The Petroleum Coordinator shall supervise the operation of these plants, after construction, but he shall not change the presently authorized program (or plans for operation) except as approved by the rubber administrator.

In delegating this added responsibility to the Petroleum Co-ordinator, the committee has sought to secure complete co-ordination of the butadiene-from-oil program with other petroleum and natural gas requirements, especially for aviation gasoline and for toluene for explosives.

As the situation develops it may be desirable that the funds required for the rubber program be put directly at the disposal of the chairman of the War Production Board for the purposes of the rubber administrator instead of, as at present, indirectly through the Federal Loan Agency.

The most important feature of these administrative changes is the type of man who is appointed as administrator. He should be a man of unusual capacity, a thoroughly competent operating and manufacturing executive, preferably with experience in the rubber industry. No plan of organization can bolster up a weak man sufficiently to meet the difficult problems he must face.

The committee has investigated, with the aid of its experts, the status of the present Government program for the production of synthetic rubber and believes that every one of the processes is technically sound and ultimately will work. The committee has also investigated many other processes not now in the Government schedule. In its opinion a number of these processes have promise, but it does not believe that any one of them gives sufficient certainty of producing more rubber quickly enough to warrant substituting it for processes already in the program.

In war one cannot wait upon perfection. Any weapon on the battlefield is better than the best weapon on a blueprint. The committee recommends that the present program be pushed forward with the greatest possible speed, without further change, except that if new projects are adopted, they be made additions to the present program.

Scheduled Production for 1943

The committee has examined the present status of the Government's schedules and estimates that, if the present construction program can be met on the dates specified and technical difficulties in reaching full production are overcome, there will be produced during 1943:

400,000 tons of Buna S;

Our experience indicates
the use of
MICRONEX W-6
for truck tires

MICRONEX W-6—is made by a process which assures just as great uniformtiy as that of Standard MICRONEX

MICRONEX

A COLUMBIAN COLLOID

BINNEY & SMITH CO. • COLUMBIAN CARBON CO.

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THE *Pioneer*

SEMI-REINFORCING

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BEADS *or* DENSE

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DISTRIBUTOR MANUFACTURER

BARUCH REPORT (Cont'd)

30,000 tons of Neoprene (in part from private sources);
62,000 tons of butyl rubber; and
24,000 tons of Thiokol (from private sources).

Only Buna S and Neoprene can be used for the combat and heavy duty tires. Between them, these two synthetics and a portion of the butyl rubber could offset the likely deficit of crude rubber which the country faces during the critical year of 1943. It is under present priorities and allocations, however, that there is grave danger that the construction of the synthetic program may be delayed by as much as four months. If this occurs, the production of Buna S in 1943 will fall below 200,000 tons, and our supplies of rubber will be inadequate for military needs.

Shortages of Critical Materials

Much has been said of shortages in critical materials. There are two kinds of shortages: The first, where there is not enough to go around for all essential purposes; the second type of shortage is where enough of the material exists, but it is not available when and where it is urgently required. There are a few materials short in the first sense; but many have been short in the second sense of failing to be where needed when needed.

In large part, this has been due to permitting materials to be used for purposes not essential to the conduct of the war; to the lack of vigorous policy of conservation, inventory control and finding of substitutes; and most of all, to the changing, complicated and ineffective methods that have been used to distribute materials and to control priorities. Shortages have been accentuated by superimposing upon the heavy military demands and the delayed conversion of civilian industry to war purposes, a vast war construction program approximating seventeen billion dollars. This program will be near completion by the end of this year—about 75 per cent is to be finished in January—and all of it about July 1, 1943. Thus, large amounts of construction materials will be released.

After this, the question of critical materials will be eased, provided vigorous measures are taken to increase supplies, to find substitutes, to press research work, to complete conversion, to effect the utmost in conservation, inventory control, standardization, and simplification, and above all, to perfect a simple workable system of priorities for the distribution of materials.

Too often an attitude of complacency has been assumed, and there has been a failure to take those vigorous measures necessary to increase supplies working closely with the industries concerned. There has been some disposition to accept the "impossible" instead of trying to overcome it.

The military men must decide what things come first in war production; but it is the duty of this committee to point out that unless the flow of materials for the construction of these synthetic rubber plants is insured, there will be no rubber in the fourth quarter of 1943 with which to equip a modern mechanized army.

Additional Recommendations Made

The year 1943 is so critical for the rubber situation that the production of 100,000 or 200,000 tons of Buna S may be the determining factor in the success of our military program. To add a greater margin of safety to the program the committee recommends these additions:

A. An increase in the production of butadiene by 100,000 tons, to be obtained from a refinery conversion program, more commonly known as "quick butadiene." This process utilizes refinery equipment made idle by the lessened demand for gasoline and which can be brought into production in six months. Since butadiene output is lagging behind styrene and polymerization capacity, if this additional butadiene can be made available quickly enough, an additional 40,000 to 50,000 tons of synthetic rubber could be produced in the critical year of 1943. This extra butadiene, too, would furnish insurance against possible difficulties with other plants and be a standby-capacity as a reserve for the future. To be of greatest value this butadiene should be brought into production by next spring. Delay on the part of the Government can turn this "quick butadiene" into slow butadiene.

The committee is concerned by the efforts on the part of many persons to substitute this so-called "quick butadiene" process for the regular butadiene plants scheduled in the Government's program. The first thought that occurs to the committee is "Why now?" Why not months ago? Why the sudden activity? And above all, "Why substitute at this late date?" The committee recommends the quick butadiene program as an addition to, not a substitution for, the present program.

B. In addition to the increase provided for through the refinery conversion program, the committee recommends another increase of 30,000 tons of Buna S. This should come from a plant to be erected during the latter part of 1943 to come into operation early in 1944.

There are two advantages in delaying construction until this time. There is good reason to believe that with the completion of the present huge war construction program, the present tightness of critical materials will be less acute and facilities for fabricating and for chemical equipment will be more readily available. Second, within the next three months it will be possible to judge better as to the relative merits of two processes for making butadiene from grain which are not now in the Government program—the so-called Polish process from alcohol and the butylene glycol process from grain.

The plants for the production of this additional 30,000 tons of Buna S by a grain using process should be located near the grain area. Such units should preferably be operated under the control of a local group.

The estimates of alcohol supplies given us by different agencies vary considerably. If no additional alcohol is provided for the expanded rubber program we have recommended, there is a possibility that at some time in the future the production of smokeless powder and other munitions may soar and alcohol be diverted from the making of rubber. We recommend that facilities for the production of 100,000,000 gallons of alcohol be erected on sites near the grain producing areas and accessible to water transportation. This would make it possible for molasses to be brought to the plants by barges after the war in the event that the manufacture of alcohol from grain proves uneconomical.

In recommending this addition to our alcohol facilities, the committee wants to make clear that it is providing only enough additional alcohol to meet the increased demands of the expanded synthetic rubber program. The committee is not saying that that is all the extra alcohol that may be needed for all war purposes. By the use of newly developed apparatus, these alcohol plants can be constructed with but little expenditure of critical materials.

The Secretary of Agriculture has assured the committee that no concern need be felt that an expansion of the alcohol and butadiene from grain will interfere with our food supply. After all food requirements that can be anticipated now are met, there still will be upwards of 1,250,000,000 bushels of wheat left on this continent.

No Civilian Relaxation Until 1944

If by the end of 1943 the actual production of synthetic rubber measures up to schedule and if synthetic rubber can be used readily, or if military or export need for rubber prove less than now anticipated, it should be possible to relax the restrictions somewhat on civilian driving. Before that can be done, however, there must be an assurance that at least 150,000 tons of Buna S rubber a year will be available, in excess of military needs, for civilian purposes.

Under the rubber rationing program recommended by the committee, civilians will continue cutting into their capital—the rubber on their tires—although at a much lesser rate than now. By 1944 a further expansion of tire replacement for civilians to repay this "borrowed rubber" will be necessary. One of the impelling reasons for the committee's recommendation that the synthetic rubber program be expanded is because we desire to see the rubber turned out that will keep America on wheels.

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As a margin of safety on the military side, we recommend the construction of 20,000 tons a year of additional Neoprene capacity.

Neoprene is the one synthetic rubber which has been shown to be the full equivalent in quality of natural rubber for combat and heavy duty tires, either by itself or in combination with Buna S. The relative high cost of Neoprene in terms of critical materials and electric power needs are offset by the fact that it is an insurance against the possibility that our imports of natural rubber, already reduced, may be cut off or that the production of Buna S in 1943 be delayed, forcing us to cut too deeply into our crude stock-pile.

Buna S Output Should be Raised

The War Production Board has fixed the total annual output of Buna S rubber at 705,000 tons for the United States. The committee recommends that this ceiling be raised by 140,000 tons to 845,000 tons. Additional styrene and polymerization capacity should be built, as necessary, to take care of the increased production of butadiene. This expansion should be directed to produce the maximum possible amount of Buna S before January 1, 1944.

In addition to Buna S, the expanded program recommended by the committee calls for 69,000 tons of Neoprene, 60,000 tons of Thiokol, 132,000 tons of butyl, with other synthetics like flexon being added to the program if they can be brought in during 1943 after being adequately tested.

At present four of the large rubber companies have designed their own polymerization facilities, each differing somewhat from the others. Each type of facility represents the best efforts of a group of keen technical men. Last May, Rubber Reserve decided to standardize all the polymerization plants to be constructed chiefly to save critical materials. In essence, this means standardizing the operation.

The design now ready is a compromise of the ideas of four separate technical groups. It may or may not incorporate the best ideas of each; on this point there are grave reasons for doubt. At all events, no one has ever operated such a standardized plant. The committee does not wish to criticize the decision, but does recognize the need for the immediate construction of one such standard plant so that experience with its operation can be obtained at the earliest moment. We recommend the swift construction of such a plant.

Sampling inspections were made of a number of crude and scrap rubber stockpiles and of the methods being used for their protection. While the situation in general is satisfactory, a number of spots were found where protection from fire is definitely inadequate. The committee suggests the advisability of more adequate protection. These stockpiles constitute some of the most critical possessions of the nation.

A very important consideration in connection with the synthetic rubber program has to do with the capacity of the country to manufacture rubber goods out of the natural and synthetic rubbers which will be available. It would be obviously foolish to carry through a program of plant construction for the manufacture of synthetic rubbers only to discover too late that the fabricating facilities were insufficient to handle the rubber.

The committee has made a survey of these facilities and finds that, as matters now stand, there will not be sufficient factory capacity to deal with the quantities of synthetic rubber that will be produced in 1944. One important limiting factor is that, at present, it takes about a third more time to fabricate synthetic than natural rubber. While this would indicate that the capacity of the industry should be increased, the technical developments in the art of processing are proceeding very rapidly and the time required to manufacture synthetic goods certainly will be reduced. It follows that output will be increased. The committee has been informed that the decision on whether to expand capacity can safely be deferred to April, 1943, and therefore recommends that the rubber administrator review the problem early next year.

The committee's findings and recommendations on plant capacity are given in greater detail in the full body of the report, which in addition contains other detailed recommendations and findings.

Huge Program Raises Many Problems

In concluding this summary of findings and recommendations, the committee wishes to point out that never before has this country embarked on an undertaking comparable to the development of the synthetic rubber program. It is not only an ambitious technical project that must be rushed to completion at breakneck speed, but in large measure it is a new political and economic undertaking. It seems to us of vital importance that this program be managed in a spirit of the fullest competition and interchange of information among all groups. On the one hand there should be the most complete interchange of information and on the other, as much competition in research, development and operation as possible. Such, after all, are the conditions in the field of laboratory science where during the last 100 years such tremendous strides have been made—co-operation and competition going hand in hand.

Nor is the committee unaware that the production of synthetic rubber is potentially a large new post-war industry and that different groups will be contesting for a share in this post-war industry. This struggle should not be allowed to obscure the basic facts of our situation as regards the war and rubber. No matter what processes were provided in the program, there would be the same uncertainties as to the future, the same huge requirements, the same threat to our essential civilian economy, and the same necessity for conserving the rubber we have until our new rubber comes in.

The committee recognizes that there still is room for reasonable scientific disagreement over many of the processes for making rubber that are being developed. It is quite possible, even likely, that before much of the synthetic rubber now planned is produced, better processes will have proved themselves. In any new industry the processes of today are outmoded by the processes of tomorrow and tomorrow's by those of the next day. However, our need for rubber quickly is too great to wait upon perfection and if this committee were to advise the newly appointed rubber administrator it would say, "bull the present program through."

Public Must Make Sacrifices

In drawing up these recommendations the committee has sought to find a basis upon which the entire nation can go forward together, uniting our energies against the enemy instead of dissipating them in domestic wrangling. It appreciates that it is asking the public to make sacrifices because of mistakes that have been made and for which the people are not to blame. But wrong things done in the past cannot be cited as a defense for making mistakes in the future. The war demands that we do these things. Victory can be won in no other way.

The committee:

JAMES B. CONANT
KARL T. COMPTON
BERNARD M. BARUCH,
Chairman.

September 10, 1942.

Form New Dirigible Company

The American Dirigible Company has been formed in Jersey City, N. J., to build dirigibles to transport freight to China and South America, according to incorporation papers recently filed in the Hudson County courts. Joseph Jordan is listed as president of the new concern which is reported to already have a factory in Virginia. The new dirigibles will carry a payload of 50 tons.

Detroit Meets October 2

The next meeting of the Detroit Rubber and Plastics Group will be held at the Hotel Detroit-Leland in Detroit, Mich., on October 2. Arrangements are being made through the Public Relations Branch of the War Department to have C. J. Cleary of the Materiel Center, Army Air Force, Wright Field, as the principal speaker. The subject of Mr. Cleary's talk is "Rubber-Like Plastics and Rubber Substitutions."

OBSOLETE RUBBER EQUIPMENT ADDS TO SALVAGE CAMPAIGN

That every rubber factory in the country is virtually a gold mine of metal, cloth, burlap, paper and other types of scrap so vitally needed to keep America's war industries going at full blast is indicated by the all-out salvage job under-

Section of scrap pile at U. S. Rubber's Providence Plant, including molds.

taken at the Providence, R. I., plant of the U. S. Rubber Co. In the short period of four months, this plant has contributed 495,666 pounds of iron and steel, 4,160 pounds of non-ferrous metal, 236,300 pounds of obsolete machinery, 47,652 pounds of paper, 61,920 pounds of cloth, and 4,396 pounds of burlap, in addition to 752,210 pounds of scrap rubber.

Like most other companies of its size, U. S. Rubber has long had an organization charged with the responsibility of collecting and sorting waste materials produced in the ordinary course of manufacture. When the War Production Board launched its vast salvage effort and asked the full support of American industry, the company immediately pledged its complete resources. The Providence plant is only an example of what is being done at all of the company's factories.

At Providence, G. E. Long, formerly superintendent of the golf ball department, upon his appointment as head of the salvage campaign by M. G. Burnett, factory manager, really started the salvage ball rolling. An increased program was set in motion for collecting, sorting, grading, recording, storing and disposing of the salvaged material. Cloth, formerly picked up as a miscellaneous collection of rags, was now separated as wool, cotton, felt, and so on. Paper was also sorted into its proper grades.

Special attention was given to all metals. An exhaustive search of the entire plant resulted in the accumulation of scrap even the officials did not know existed. A special study of idle equipment was undertaken in conjunction with the Engineering and Planning Department. As a result of this activity, a complete rubber mill line was scrapped which included six mills of twelve tons each. In addition, three twenty-ton calenders were marked for disposal. Particular contribution to the metal collection was made by the inclusion of the calenders' chilled iron rollers.

Other standing equipment and machinery were removed and sold for reuse or broken up for scrap. Wherever possible, metals were altered for use within the plant. For instance, a considerable quantity of steel molds was scrapped, from which were saved flat plates of various sizes. From these were made special pipe flanges and special machine parts. In spite of the fact that this method was found to be more expensive, it was continued in the interest of conservation. Three beam dinkers were also disposed of by the company.

The salvaging of scrap rubber, always the company's largest single item, was given even closer attention than before. Development effort was directed toward conserving not only rubber but many of the compounding ingredients used in making rubber products. Recipes were revised and in many cases complete substitutes for scarce materials were found. Substitutes for brass and other metal accessory parts are also being used. This study is continuing with additional replacements in mind.

So effective a conservation program as that of the United States Rubber plant in Providence could hardly have been put into operation without the enthusiastic support of the factory personnel. The posting of imaginative billboards in all departments was a large factor in putting the workers behind the campaign. These posters, created by the local talent about the plant, were changed weekly. Serving as progress reports of scrap released, carrying slogans and cartoons descriptive of the work being done, the drawings served as an excellent stimulant to worker interest in the collection.

The effectiveness of the promotion can be seen in the fact that operators not only did a thorough job of cleaning their own benches but helped to clean their respective buildings and offered suggestions for removing scrap from other departments. Many employees brought in their old registration plates from their automobiles.

To Make Blimps in Arizona

Navy blimps for use in spotting submarines engaged in plying American waters will be manufactured in the soon-to-be-completed plant of the Goodyear Aircraft Corp. at Litchfield Park, Arizona. Some of the K ship personnel from Akron are being transferred to the Arizona plant to help begin assembly of the 416,000 cubic foot craft.

NEW GOODRICH TWO-POUND SELF-INFLATING LIFE-SAVING BELT

One of the two-pound, self-inflating life belts designed to cope with today's sea hazards gets its final test for leaks before being folded and packed at one of the plants of the B. F. Goodrich Co. The belt is inflated by a carbon dioxide cartridge, and a mouthpiece and tube attached to each of two rubberized chambers enable the wearer to maintain buoyancy during long periods of drifting.

Montreal Group Schedules Meetings

The Rubber and Plastics Division, Montreal Section, Society of Chemical Industry, formerly known as the Montreal Rubber and Plastics Group, has announced its schedule of meetings for the fall and winter season. The dates of the meetings, which will be held in the McGill Faculty Club, 3450 McTavish Street, Montreal, together with the scheduled programs, follow:

October 9: "Bouncing Molecules," a new Kodachrome sound picture prepared by the Esso Laboratories of the Standard Oil Development Co.

November 13: "Plastics," an address by A. E. Byrne, Manager of the Plastics Division, Canadian General Electric Co., Toronto.

December 16: "Synthetic Rubber," an address by Dr. H. I. Cramer of Sharples Chemicals, Inc., Philadelphia. (This will be a joint meeting with the Montreal Section of the Society.)

January 8: A symposium designed to acquaint rubber chemists with the plastics industry and plastic molders with rubber technology will be held.

February 12: "Modern Developments in Adhesives," an address by Dr. W. Galley of the National Research Laboratories, Ottawa.

March 12: A trip to Granby, Quebec, has been arranged where the members of the Division will be guests of the Miner Rubber Co.

April 9: "Developments in the Functional Utilization of Plastic Materials," an address by H. K. Nason, Assistant Director of Research, Monsanto Chemical Co., Springfield, Mass.

New York Group To Meet

The New York Group, Rubber Division, A.C.S., will hold its regular Fall meeting on Friday, October 16, at the Building Trades Club in New York City. Announcement of the program will be made in the near future. One of the features of the meeting will be a synthetic rubber quiz following the lines of the popular radio quiz programs. Some interesting questions are being prepared. Tickets for the meeting will sell at $2.00 each, including dinner, and can be secured from the secretary-treasurer of the group, Peter P. Pinto, RUBBER AGE, 250 West 57th St., New York City.

Chicago Meets October 16

The next meeting of the Chicago Group, Rubber Division, A.C.S., will be held at the Hotel Bismark on Friday, October 16. Dr. I. Drogin, director of research for the United Carbon Co., Charleston, West Virginia, will be the principal speaker. He will discuss some of the results of the study of carbon black in natural and various synthetic rubbers recently undertaken by the company, the work on which is still continuing.

Ersatz Oil from Tires

Reversing the process, the Nazi Institute of Lignite and Mineral Oil Research has discovered a way to make gasoline and heavy oil from rubber tires, according to a report reaching the Bureau of Foreign & Domestic Commerce. Using a carbonization method to treat the rubber, the process is said to yield 46% (by weight) of coke, 35% of tar, and smaller amounts of gas and fluid. The "tar" is further treated by distillation, yielding 16.8% gasoline, 50.7% Diesel oil, and 32.3% residual oils. Although the "rubber gasoline" is reported to have high anti-knock, it also has a high sulfur content, which adds to the difficulties of refining. Certain resinous substances also remain in the products. The Nazis now have only two problems: To make the process commercially feasible and to get the rubber tires.

Organizing Reclaim Plant

The rubber reclaiming plant to be operated by the Southwest Rubber Reclaiming Corp. at Fort Worth, Texas, reference to which was made in our April, 1942, issue, is finally getting under way. It is understood that the corporation has received a substantial loan from the R.F.C. and will construct a plant with an annual capacity of 40,000 tons. The alkali process will be used. Machinery and equipment has already been purchased, largely from second-hand dealers, and operation of the plant is scheduled in approximately four months. Officers of the corporation include J. Wesley Smith, president; Harold A. Sims, executive vice-president; and B. B. Stone, secretary-treasurer. Mr. Sims formerly operated the old Champaign Rubber Mfg. Co., at Urbana, Ill., and more recently was connected with the reclaiming division of one of the Chicago rubber manufacturers.

New Type of Transmission Belt

A new type of transmission belt, adapted especially to agricultural uses, which uses 90% less rubber than ever before but which is said to be superior in performance to previous types, has been introduced by the Goodyear Tire & Rubber Co. Known as the Klingtite Cord Hammermill Belt, the new agricultural belt is modelled closely after the company's endless Compass Cord belt. Flex life of the new belt is claimed to be six times that of preceding types with higher crude construction. It is being produced in six and seven-inch widths, in 50, 60 and 75-foot lengths.

New Technical Data Available

The British Rubber Producers' Research Association, 19 Fenchurch Street, London, E.C. 3, England, has recently made available a number of new technical pamphlets. These pamphlets, comprising reprints appearing in various technical journals, are available without cost on request. The titles of the pamphlets, and the authors of the articles, follow:

Rubber, Polyisoprenes and Allied Compounds. I. The Synthesis of Low-Molecular Polyisoprenes of the Rubber and the Squalene Type, E. H. Farmer and D. A. Sutton.

The Course of Autoxidation Reactions in Polyisoprenes and Allied Compounds. I. The Structure and Reactive Tendencies of the Peroxides of Simple Olefins, E. H. Farmer and Sundralingam.

The Course of Autoxidation Reactions in Polyisoprenes and Allied Compounds. II. Hydroperoxidic Structure and Chain Scission in Low-Molecular Polyisoprenes, E. H. Farmer and D. A. Sutton.

The Interaction Between Rubber and Liquids. I. A Thermodynamical Study of the System Rubber-Benzene, G. Gee and L. R. G. Treloar.

The Caoutchol Component of Natural Rubber: A Correction, K. C. Roberts.

Analytical Methods in Rubber Chemistry. V. Estimation of the Oxygen of Highly Autoxidized Rubber Contained in Carboxyl, Ester, Carbonyl, Epoxide and Hydroxyl Groups, F. Hilton.

Join Chemurgy Design Corp.

A. Brothman and A. P. Weber, both formerly connected with the engineering department of the Hendrick Mfg. Co., have joined the Chemurgy Design Corp., a division of the Golwynne Chemicals Corp., New York City. Mr. Brothman has been made vice-president and chief engineer and Mr. Weber secretary and assistant to the president, H. A. Golwynne. The Chemurgy Design Corp. is extending its work into the design of plants for the manufacture of synthetic rubber, a field in which both Mr. Brothman and Mr. Weber have been actively engaged, recently applying for patents covering the design of plants for the continuous production of Buna.

Shift Executive Sales Office

The executive sales office of the Columbia Chemical Division of the Pittsburgh Plate Glass Co., formerly located at 30 Rockefeller Plaza, New York City, has been shifted to the general headquarters of the parent concern in the Grant Building, Pittsburgh, Penna. A. E. Boss, manager of pigment sales of the Columbia Chemical Division, is now located at the Pittsburgh office, but Eli Winkler, executive consultant, remains in New York. The district sales office is being continued at 30 Rockefeller Plaza, New York.

ACCIDENT RATES IN INDUSTRY REPORTED BY SAFETY COUNCIL

Injury rates of rubber manufacturers in 1941 ranked among the lowest in American industry, according to a report issued by the National Safety Council. Rubber's frequency rate of 8.10 was seventh in a list of 31 major industries. The industry's showing in severity was better, rubber companies averaging 0.62 against an average of 1.53 for all industries and ranking sixth in the list.

The 1941 experience of the rubber industry was based on data from 44 plants, which is less than the number reporting for 1940. Working time in 1941, however, was the largest ever reported. Highlights of the 1941 experience of the rubber industry, as reported by the Council, follow:

1. Frequency rates averaged 8.10 reportable injuries per million hours worked—47 per cent below the all-industry average of 15.39.

2. Rubber company severity rates averaged 0.62 days disability per thousand hours worked—60 per cent below the average of 1.53 for all industries.

3. The industry's 1941 frequency rate was 13 per cent higher than the 1940 average. The general increase in this rate was only 8 per cent.

4. Severity rates averaged 2 per cent lower than in 1940. This reduction was less than the average decrease of 8 per cent for all industries.

5. Cumulative reductions in injury rates since 1926 were 70 per cent for frequency and 49 per cent for severity. Progress in frequency has exceeded the average reduction for industry as a whole. Improvement in severity, however, has been slightly less than the general decline.

6. Large plants had the lowest 1941 frequency rates, averaging 8.97. Small plants, however, continued to have the lowest severity rates, averaging 0.31.

7. Large units made the only improvement from 1940 in either injury rate—a reduction of 10 per cent in severity. Both injury rates soared in small plants.

8. Injury rates were highest in tire manufacturing plants, averaging 9.75 for frequency and 0.78 for severity.

9. Only footwear manufacturing plants reduced frequency rates in comparison with 1940. Severity rates decreased only in mechanical rubber goods manufacturing.

10. Reports covering 62 fatalities and permanent partial disabilities show that the principal unsafe conditions involved in the accidents were hazardous working methods and processes such as poor housekeeping, followed by inadequate guarding and worn, broken, poorly designed tools and equipment. The principal personal causes were disobedience of instructions, abstraction, and other improper attitudes.

11. The Providence, R. I., plant of the U. S. Rubber Company holds the best all-time no-injury record in the industry—5,688,369 man-hours.

Coming Events

Oct. 2. Detroit Rubber & Plastics Group, Hotel Detroit-Leland, Detroit, Mich.

Oct. 6. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

Oct. 9. Rubber & Plastics Division, Montreal Section, Society of Chemical Industry, McGill Faculty Club, Montreal, Canada.

Oct. 12-14. American Society of Mechanical Engineers, Fall Meeting, Rochester, N. Y.

Oct. 16. New York Rubber Group, Building Trades Club, New York City.

Oct. 16. Chicago Rubber Group, Hotel Bismark, Chicago, Ill.

Oct. 27-29. National Safety Congress, Sherman Hotel, Chicago, Ill.

Nov. 13. Rubber & Plastics Division, Montreal Section, Society of Chemical Industry, McGill Faculty Club, Montreal, Canada.

Nov. 16-18. American Institute of Chemical Engineers, Annual Meeting, Hotel Netherlands Plaza, Cincinnati, Ohio.

Nov. 24-29. Second National Chemical Exposition, Sherman Hotel, Chicago, Ill.

Nov. 30-Dec. 4. American Society of Mechanical Engineers, Annual Meeting, New York City.

Dec. 16. Rubber & Plastics Division, Montreal Section, Society of Chemical Industry, McGill Faculty Club, Montreal, Canada.

Changes in Chemicals Branch

Several important changes in the executive personnel and organization of the Chemicals Branch of WPB were announced on August 31 by Dr. E. W. Reid, chief of the branch. Lawrence Brown, formerly staff sections coordinator, has been named assistant branch chief in charge of the five staff sections.

A new plastics and synthetic rubber section has been established, replacing the two sections heretofore operated separately in these fields. Frank Carman, formerly chief of the Synthetic Rubber Section, has been named chief of the new larger section. Arthur Petersen, formerly chief of the Plastics Section, becomes chief of the Products Advisory Section.

In the shake-up, the allocation of synthetic rubber, formerly handled by the Synthetic Rubber Section, has been transferred to the Rubber Branch. In addition to the transfer of function, Ralph Wolf, Bryant Ross and Walter Peterson were also transferred to the Rubber Branch, where they will continue their duties on synthetic rubber allocation.

STEEL MILLS SALVAGING LARGE SUPPLIES OF SCRAP

Although steel mills are working at capacity to meet war production needs, these mills are obliged to economize on rubber in the same way factories of all kinds are being forced to economize. These steel mills are also contributing large quantities of scrap rubber as well. As an example, a final check-up by the Bethlehem Steel Company indicates that 210,000 pounds of rubber was salvaged from its steel plants and shipyards during the recent nation-wide scrap rubber drive. The reclaim made from this amount of scrap could produce tires for 5,000 jeeps.

Before Pearl Harbor probably not more than ten per cent of this rubber would have been considered worth saving. While the steel industry normally makes extensive use of rubber, collection costs would be too high to warrant salvaging any great amount of the scrap rubber reclaimable from the hundred-and-one miscellaneous uses to which it is put in steel plants. Heretofore worn-out rubber conveyor belts, rubber hose and truck tires have been about the only types of rubber scrap around a steel plant considered worth salvaging.

Today, even the rubber from the ends of insulated copper wire is saved for scrap, and the industry has reduced its normal use of rubber by about one-third. Bethlehem Steel reports that it is now employing only about one-third as much rubber as formerly in hose lines. Fire hose is called for in greater quantities than ever, but in all incidental uses one rubber hose is made to serve for two, and hose in service is repeatedly spliced rather than replaced when breaks occur. Bricks impregnated with sulfur and resinous compounds are being substituted for rubber in the linings of pickling tanks in which steel is immersed to remove surface oxides.

Leather, fiber, asbestos and graphitic materials are being substituted wherever possible as packing materials in water lines. "Weather-coat" electrical wiring on which asphalt and fiber supplant rubber is being substituted when it can be for standard rubber coated wire.

War Production Board restrictions on the true rubber content in most types of equipment has automatically reduced the steel industry's consumption of rubber by an added 20 per cent. Even the rubber content of the heels of the "safety" shoes worn by steel workers is down 20 per cent.

All-Synthetic Conveyor Belt

Hewitt Rubber Corp., Buffalo, N. Y., has announced the successful manufacture of an all-synthetic rubber conveyor belt which is believed to be the first of its kind made from Buna S without the addition of any natural or reclaimed rubber. As supplies of crude rubber grow scarcer and more Buna S comes into production, practically all mechanical goods will be made from the synthetic.

NAMES IN THE NEWS

VICTOR E. WILLIAMS, assistant general manager of sales of the Organic Chemicals Division of the Monsanto Chemical Co., with headquarters in New York, has been promoted to director of sales of that division. He will remain in New York for the time being. FREDERICK C. RENNER, who has also been acting as assistant general manager of sales of the division, has been promoted to general manager of sales, with offices in St. Louis, Mo.

NORMAN BEKKEDAHL, associated with the rubber laboratory of the National Bureau of Standards for the past several years, is leaving shortly for Brazil where he will help install and operate a complete rubber laboratory for the Instituto Agronimico do Norte which was organized to foster rubber developments in that country under the special program sponsored by the Rubber Reserve Co.

DR. R. V. YOHE, of the B. F. Goodrich Co., and R. H. BOUNDY, of the Dow Chemical Co., have been appointed members of the Synthetic Rubber Technical Advisory Committee of the Ministry of Munitions and Supply of Canada.

WILLIAM T. HUNTER, president of A. Schrader's Son, Inc., Brooklyn, N. Y., has been elected a director of the Home Life Insurance Co. of New York. He is also a vice-president of the Scovill Mfg. Co.

A. D. MACLACHLAN, development engineer, formerly with the B. F. Goodrich Co., has joined the Hood Rubber Co., Watertown, Mass. He has been influential in hose and coupling design for the last few years.

ERNEST G. BROWN, who formerly was production manager of the general products, mechanical goods and thread divisions of U. S. Rubber, has been named general manager of the shell loading plant to be operated by the company for the Navy in North Carolina. He will also act in a similar capacity at the ordnance plant being operated by the company for the Army in Ohio.

K. C. FRAZIER has been appointed district sales manager of the New York Metropolitan area for the Columbia Chemical Division of the Pittsburgh Plate Glass Co. Mr. FRAZIER, who for the past 10 years has been southwestern manager of the Southern Alkali Corp., an affiliate of Pittsburgh Plate Glass, will maintain headquarters in the New York sales office.

CLARENCE H. LOW, one-time executive of the U. S. Rubber Reclaiming Co., who has been acting as chairman of the New York City Salvage Committee for the past seven months, resigned that post on August 21. He is expected to accept another appointment in the overall war effort shortly.

ARTHUR M. NEAL, director of rubber research at the Jackson Laboratory of DuPont, has been shifted to the rubber laboratory maintained by the company's Rubber Chemicals Division where he will act as assistant director. H. G. BIMMERMAN is director of the laboratory and S. G. BYAM is associate director.

DR. JOSEPH ROCKOFF, chief chemist, Dayton Rubber Mfg. Co., Dayton, Ohio, has been appointed a member of the Technical Committee for Individual Awards recently created by the Office of War Information. The committee will select the first list of workers in war plants to be honored by the Government for contributing valuable suggestions for increasing production.

LLOYD F. LEATHERMAN, associated with the Seiberling Rubber Co., Akron, for the past 16 years, has been named chief chemist of the Lima Cord Sole & Heel Co., Lima, Ohio, succeeding JOHN RUMBAUGH who recently resigned to enter the Army Air Corps.

Washington Appointments

Ernest Kanzler, who has been serving as Deputy Chairman on Program Progress for WPB, has been appointed Director General for Operations, succeeding Amory Houghton, who resigned as of September 15 to return to his position as chairman of the board of the Corning Glass Works.

Hans Brunner, who served as factory manager of the Essex Rubber Co., Trenton, N. J., from 1912 to 1940, and who has been doing special consulting work since, has joined the Rubber Branch of WPB. His duties will center around classifying and setting standards for grades of reclaimed rubber and determining methods of making good reclaim from low-grade scrap.

Dr. David Spence, noted rubber technologist and closely associated with the development of guayule in the United States, has been appointed Chairman of the Advisory Technical Committee on Raw Rubber of WPB.

IN THE SERVICE

OSCAR DOBKIN, formerly superintendent of the Highnote Rubber Co., Dallas, Texas, and associated at various times with other rubber manufacturing firms in the southwest, is now a Second Lieutenant in the Chemical Warfare Service and is stationed at the Property Office, Camp Gruber, Oklahoma.

R. P. PAINTER, until recently associated with the Mansfield Tire & Rubber Co. as a research chemist, has joined the Engineering Division of the Naval Aircraft Factory at the U. S. Navy Yard in Philadelphia, Penna.

FOSTER J. YOUNG, development engineer, Goodyear Tire & Rubber Co., is now serving as a major in the Products Engineering Section, Materials Command, Wright Field, Dayton, Ohio. He was active in the Army Reserve Corps since his graduation from Ohio State University in 1925.

P. E. CHANCE, general manager of the Brake Lining Manufacturers Association, has joined the Motor Transport Corps of the Army and is currently stationed at Atlanta, Ga. The affairs of the association will be carried on by the secretary.

JOHN RUMBAUGH, chief chemist of the Lima Cord Sole & Heel Co., Lima, Ohio, for the past several years, has joined the Army Air Corps.

GEORGE E. PRICE, JR., purchasing agent, Goodyear Tire & Rubber Co., since 1927, has been ordered to active duty as a lieutenant colonel in the U. S. Army, Service of Supply. He served in the last war and since then has held a major's commission in the Quartermaster Corps of the reserve army.

JOHN M. "JACK" HAMILTON, sales manager of the carbon black division of the Binney & Smith Co., New York City, has resigned to accept a commission in the Navy. His work at Binney & Smith is being handled by J. W. Snyder.

H. K. CLARK, vice-president and general manager of the Norton Co., Worcester, Mass., has been appointed a lieutenant commander by the Navy and currently is acting as a member of the Army & Navy Munitions Board.

WILLIAM J. GRUBBS, JR., engineer at the Firestone Tire & Rubber Co., Akron, for the past five years, has been awarded a lieutenant's commission in the Navy and has already reported for active duty.

LYMAN HITCHCOCK, rubber chemist of the General Electric Co., Bridgeport, Conn., has been commissioned a major in the U. S. Signal Corps, and is currently stationed at Fort Monmouth, N. J.

SEVERAL NEW TIRE-SAVING DEVICES DEVELOPED AND INTRODUCED

While official Washington ponders the problem of how much of which material to make available for the retreading and recapping of so-called non-essential civilian tires, the development of tire-saving devices to extend the life of present tires continues. Several of these have come to light in recent weeks, including the following:

U. S. Rubber's "Sandal"

A "tire sandal" made of non-strategic materials and treated with an asphalt emulsion has been developed by the U. S. Rubber Co. Tests conducted to date indicate that this "sandal" will give from 2,500 to 3,000 miles of additional life to tires.

Developed by Martin Castricum of the development department of the tire division, the "sandal" is made of cotton pile fabric and is a carpet-like material, somewhat resembling a closely-stitched bath mat or rug. Present production plans call for the weaving of the material at one of the mills of the Bigelow-Sanford Co., with the asphalt emulsion treatment applied at one of the U. S. Rubber plants.

For efficient use of the "sandal," according to U. S. Rubber, it is necessary to carry 40 pounds of pressure in the tires and limit the speed of the vehicle to 30 miles per hour. They should be mounted by a competent tire service man. It will be made available in popular passenger car sizes and further development is being conducted to obtain a material suitable for use on light delivery trucks.

In announcing the "sandal," disclosure of which was first made at a recent meeting of the so-called Zeder Committee in Detroit, the company pointed out that it is not as practical nor as cheap as recapping, but was simply developed as a stop-gap material having in its favor the use of non-strategic materials which means that production could be unlimited if necessary or desirable.

It was also emphasized that the new asphalt-treated material could be used by the armed forces for tires on portable air compressors, bomb carriages and civilian defense fire carts, etc., but it would not be feasible for use on motorized equipment with present day high-speed requirements. In applying the "sandal," it is wrapped around the tire with the "ears" tucked between the tire and the rim to hold it in place when the tire is inflated.

Martin Castricum, designer, displaying U. S. Rubber's "tire sandal."

Southern Mills' Cush-O-Liner

Southern Mills, Inc., Atlanta, Ga., have introduced a 100% cotton interliner to protect inner tubes from sharp rocks, glass, nails, tacks, etc. Called the Cush-O-Liner, this tire-saving device, which is somewhat similar to the cotton cord protector introduced recently by Firestone, can be used to prolong the life of tires which are worn thin, cracked, rough inside, or broken.

Cush-O-Liner is a strip of strong, thick cotton padding which has been cut to fit between the inner tube and the casing of a tire. It is already in mass production and is made in all standard sizes. According to the manufacturers, tires that have been worn completely through their rubber surface give additional mileage when Cush-O-Liner is installed.

Hemisphere's Metallic Band

Currently being advertised in the United States is a metallic band covered with a fiber wearing surface which fits and locks over the tire by a patented process, taking all the wear from the rubber tread. Manufactured by the Hemisphere Tire Corp., Mexico City, Mexico, this tire-saving device can be used with brand new tires or those which are badly worn. In short, it will work with any tire that holds air.

The Hemisphere invention can be used with any size tire or wheel and no special equipment other than the band is required. The inventors claim that by equipping tires with the new device, which can be replaced as the surface wears, tire life is prolonged indefinitely as long as the casing will still hold air.

New Method of Retreading

On the subject of tire-saving devices, the claims of U. S. Patent No. 2,292,286, recently issued to Allison D. Owen of San Francicso and assigned to the Paul E. Hawkinson Co. of Minneapolis, are of interest. According to this patent, new treads can be quickly "slipped on" smooth tire casings.

In the process there is first preformed and pre-cured an endless annular band of elastic tread material. Next, the beads of the casing are spread to temporarily reduce the size of the casing, thus "shrinking" it. This permits the tread band to be slipped over the tire, which normally has a greater diameter than the band. Before the tread is slipped on, rubber cement is spread on the band.

Inserting Southern Mills' 100% cotton interliner to protect tubes.

When the "spreading" action on the beads is released, the tire returns to its normal size. This expansion stretches the newly-applied tread band so that it compresses the cement. The cement is then cured, with the result that a permanent bond between the tread and the casing is effected.

More on Wooden Tires

Although most of the substitutes for pneumatic tires are largely developed for the inventor's satisfaction, Dugan Brothers, chain store bakers of Newark, N. J., are quite serious in their use of wooden tires and have developed a mass production system. These tires are used only on the front wheels of the company's delivery trucks because they lack sufficient traction for the rear. Brake lining is used for treads.

The company's method of making these tires, according to the current issue of *Schrader News*, house organ of A. Schrader's Son, follows: One-inch planks of well-seasoned hickory are marked from a template, mitred to 45 degrees, and then a rough quarter-section cut out with a band saw, graining running the long way. The tires are built up with five layers, the sections being dovetailed together. The center layer has a slot for an eyebolt which anchors the tire to the rim and which is held in place by a transverse bolt.

Each segment of the tire is fastened to the next with glue and screws. The tire in assembled form is checked for accuracy and is then trued up on a lathe. A heavy strip of brake lining is then applied for the tread, brake lining giving better traction than the bare wood and also cushioning some of the vibration. According to Dugan Brothers, the trucks steer easier with wooden tires and at 25 or 30 miles an hour they ride well on smooth roads. On cobblestones, however, the wooden tires jolt like the old-fashioned wagon wheel.

A. E. Powell, chief chemist of the rubber dispersions division of the Flintkote Co., Morristown, N. J., has joined the Rubber Reserve Co. He will work on synthetic rubber problems.

FINANCIAL NEWS

GOODRICH NET DROPS SHARPLY IN FIRST SIX MONTHS OF 1942

Consolidated net profit of the B. F. Goodrich Co. for the first six months of the current year amounted to $3,103,087, after all charges including provision of $14,068,000 for domestic and foreign income and excess profits taxes and $1,000,000 for contingencies, equal to $1.59 a share on the common stock after preferred dividend requirements. This compares with $6,646,033, or $4.31 a share, after provision of $4,741,000 for similar taxes and $1,000,000 for contingencies, reported for the first six months of 1941.

Consolidated net sales for the first half of this year amounted to $103,283,542, an increase of 5.4% from the volume of $98,005,059 reported for the comparable period last year. Current assets as of June 30, 1942, amounted to $99,879,662 and current liabilities to $27,913,708, a ratio of more than three and one-half to one.

The board of directors have declared the regular quarterly dividend on the $5.00 cumulative preferred stock and a 50-cent dividend to holders of the common stock. This is the first dividend voted on the common stock this year. Last year, holders of common stock received 25 cents in March, 50 cents in August and $1.25 in December.

INTERCONTINENTAL RUBBER CO. REPORTS PROFIT OF $177,553

Intercontinental Rubber Co. reports a net income of $177,553 for the six months ended June 30, 1942, after all charges and taxes. This is equal to 30c each on 595,832 capital common shares outstanding and compares with $149,908, or 25c a share, for the corresponding 1941 period. No deduction was made for any loss sustained in Sumatra because of the Japanese occupation.

According to the report, Intercontinental received a payment of $750,000 on account of the Government's purchase of its guayule business in California in the first half of the year. The balance of $971,235 has since been received and deposited in a special account. The excess over book value of these properties, amounting to $989,121, was added to the capital surplus account, which stood at $1,992,433 on June 30, 1942.

In connection with its holdings in Sumatra, the company reports that it has received no definite news since the Japanese took possession. At the close of 1941, Intercontinental established a reserve for war losses and rehabilitation of $279,598, which was the amount of its earned surplus at that time.

FIRESTONE TIRE & RUBBER NETS $11,023,372 FOR YEAR

Firestone Tire & Rubber Co. and its subsidiaries report a net profit of $11,023,372 for the twelve-month period ended May 30, 1942, after Federal taxes, including $9,925,166 estimated excess profits taxes and after provision of $6,526,156 additional reserve for contingencies, according to the statement made available under the regulations of the Securities and Exchange Commission.

The net profit, after dividend requirements on the 6% preferred stock, is equal to $4.29 each on 1,931,121 shares of common stock. While no direct comparison is available because of a change in fiscal year, the company's report for the year ended October 31, 1941, showed a net profit of $11,262,428, or $4.37 each on 1,937,026 shares of common stock, after preferred dividends.

Mohawk Rubber Company

A cash dividend of 50 cents per share to be distributed on October 15 to holders of new common stock of record on September 15 has been declared by the board of directors of the Mohawk Rubber Co. According to a letter sent to the company's stockholders under date of August 19, the participation of the stockholders in the company's plan of total reorganization in 1938 has proved very helpful. This cooperation made it possible to eliminate an issue of preferred stock amounting to $2,164,000 with $1,022,000 of accumulated dividends.

The plan provided for the liquidation of $736,672 of overdue indebtedness and the extension of $253,000 of debenture bonds to 1948 at a lower rate of interest. Funds have been deposited to pay all outstanding bonds which will enable the company to cancel a mortgage that has existed since 1928. This places the new common stock second only to normal current indebtedness. Since the reorganization, net working capital has been rebuilt to over $1,000,000.

Net profits for the first seven months of 1942 amounted to $157,800, after all charges including a provision for Federal income taxes. The company's position, according to the letter to stockholders, is the strongest in its history.

Philadelphia Insulated Wire Co.

First Half: Net loss of $1,917 which contrasts with net income of $23,154 last year. Heavier taxes and restrictions on production largely accounted for the reverse position.

Thermoid Company

First Half: Net profit of $263,551, after provision of $380,000 for Federal income taxes, equal to 45c a share on the common stock after preferred dividend requirements, which compares with $440,955, or 81c a share, reported for the first half of 1941. For the June quarter, net profit amounted to $53,522, after provision of $235,000 for taxes, which compares with $230,612 reported for the 1941 quarter. A statement accompanying the report discloses that the company can now make hose without rubber of any kind.

Canada Wire & Cable Co.

First Half: Net income of $304,919, equal after preferred dividend requirements on preferred and Class A stocks to $1.01 a share on 150,664 shares of Class B stocks, which compares with $418,475, or $1.77 a share on the Class B stocks, reported for the first half of last year. Provision for income and excess profits taxes amounted to $1,066,000, compared with $952,000 for the 1941 period.

Belden Manufacturing Co.

First Half: Net income of $247,722, equal to $1.03 each on 241,547 shares, which compares with $283,912, or $1.18 a share, reported for the first half of last year. Net sales amounted to $4,596,681 and $4,644,537 for the respective periods. Net income in the June quarter amounted to $94,382 which compares with $153,898 in the corresponding 1941 quarter.

Raybestos-Manhattan, Inc.

First Half: Net profit of $867,157, after provision of $3,590,000 for Federal income and excess profits taxes, equal to $1.38 each on 628,100 shares, which compares with $1,142,973, or $1.82 a share, reported for the corresponding period of 1941 when income taxes amounted to $2,050,000.

United Carbon Company

First Half: Net profit of $920,990, after provision of $801,000 for Federal income and excess profits taxes, equal to $2.31 each on 397,855 shares of common stock, which compares with $957,801, or $2.41 a share, in the first half of last year.

Columbian Carbon Company

First Half: Net income of $1,546,156, equal to $2.88 each on 537,406 common shares, which compares with $1,904,036, or $3.54 a share, in the corresponding period last year. Provisions for Federal income and excess profits taxes were $1,200,000 and $900,000, respectively.

Price Plot Charged on Cable

Nine corporations supplying all of a special patented electric cable designed to resist flame, shock and water, and used in the complex wiring systems of Navy ships, were charged with "conspiring to make identical bids at unreasonable high prices" in a sealed indictment returned by a Federal Grand Jury at Newark, N. J., on August 17, made public on August 24. The companies named were: Rockbestos Products Corp., General Electric Co., Okonite Co., Collyer Insulated Wire Co., American Steel & Wire Co., General Cable Co., National Electric Products Co., Anaconda Wire & Cable Co., and the Phelps Dodge Copper Products Corp. The cable involved in the charges, vigorously refuted by all of the defendants, is "AVC" cable, manufactured under the Anderson patents, owned by the Rockbestos Products Corp. This type of cable does not make use of rubber.

Grant Patent on Cellulose Cord

U. S. Patent No. 2,291,700 has been issued to the Celanese Corporation of America, on application of Dr. Henry Dreyfus, on cellulose cord. According to the patent, regenerated cellulosic yarns or cords of high tenacity are rendered more easily united to rubber by coating them with a composition containing an unstable compound of cellulose in admixture with a dispersion of rubber; for example, rubber latex. The cellulose in the composition is then regenerated and the rubber dispersion coagulated, resulting in a firm and permanent bond between the cellulose yarns or cords and the rubber. The method is said to be particularly advantageous in tire manufacture.

Resigns from Paramount Rubber

H. Tom Collord, founder and president of Paramount Rubber Service, Inc., Detroit, Mich., has disposed of all his interest in that company and has announced that he has resigned from all official connection with that concern. For the time being, Mr. Collord will devote his full attention to developing the business of Protective Coatings, Inc., which he also founded last year. The latter concern specializes in coatings of various types for all kinds of materials.

Changes at Servus Rubber Co.

Clinton E. Little, who has been vice-president and general manager of the Servus Rubber Co., Rock Island, Ill., for the past six years, has been elected president of that company, succeeding the late Max Kalter. Joseph M. Schaap has been elected chairman of the board and treasurer, and J. Arronson, executive vice-president. The elections were made at a meeting of the company's directorate held in Chicago on August 11.

Prolatex Rubber Saving System

The Prolatex Rubber Saving System, which incorporates the use of a new tire preservative, has been made available to tire and automobile dealers by the Transmotive Laboratories, 2550 So. Michigan Ave., Chicago, Ill. The system includes drums of Prolatex, cans of White-Wall Prolatex, and a dipping tank with cover and brush. Prolatex is described as "a vegetable-base penetrant combining a number of rubber preserving materials."

The tire is dipped into the Prolatex, the material thus entering the pores, cuts and abrasions, making a positive seal against gasoline, oil and grease. It is also said to provide absolute protection against ultra-violet rays and to prevent oxidation of the rubber.

Prolatex may also be used to preserve the life of floor mats, running board mats, fender pads, and other rubber products. Approval of the Prolatex system is reported to have been given by the Oldsmobile Division of General Motors. Mr. Sam Davis, head of the Transmotive concern, is an Oldsmobile dealer.

Haydenite—A New Substitute

A new synthetic formulated from the plastic formerly used in the manufacture of safety glass for automobiles has been developed by the Stanley Chemical Co., East Berlin, Conn. Known as Haydenite, the new synthetic is reported to be an excellent substitute for rubber in army raincoats and, according to Stanley Chemical, is better than rubber, cheaper than previous waterproof coatings, and easier to apply than other synthetics. The new material, which is also expected to find application in other products using waterproofed fabrics, was named after E. M. Hayden, technical director of the Stanley concern.

General Head Attacks Labor

William O'Neil, president of the General Tire & Rubber Co., Akron, issued a statement on August 30 in which he accused Akron of being the "worst labor spot in the country" and blamed labor with cutting the rate of tire production "to less than it was before Pearl Harbor." He accused the rubber union of deliberately slowing up production and refusing to allow members to do more work and stated that the union was trying "to get a four and a half hour day with six hours' pay." Referring to the War Labor Board he said that it is not a labor board as such and "doesn't represent anything but a racket." Mr. O'Neil's charges were quickly met with full denials by officials of the United Rubber Workers of America, one of whom proposed a five-point program to step up production in the tire field.

Create Surgical Goods Committee

The creation of a special Medical and Surgical Rubber Goods Advisory Committee was announced by WPB late last month. The following were appointed members of the new committee: J. Stone Carlson (Davidson Rubber), Karl Herbruck (Wilson Rubber), Ernest I. Kilcup (Davol Rubber), F. Thatcher Lane (Seamless Rubber), R. L. Limbert (Lee Tire), W. B. McIntosh (Pyramid Rubber), W. S. Richardson (Goodrich), Julius Schmid, Jr. (Julius Schmid, Inc), E. Ward Stearns (Parker-Stearns), and Ray A. Whidden (Bauer & Black). C. S. Reynolds of the Rubber Branch is Government presiding officer of the committee.

Winkelmann to Give Course

Dr. H. A. Winkelmann, technical director of the Dryden Rubber Co., will again give a course on synthetic rubber at the Illinois Institute of Technology this fall. He gave a similar course last year. The course will cover a 16-week period, beginning October 12, and will consist of two lectures per week. Specially-selected speakers will discuss various pertinent problems and their solutions during the course. Further details can be secured from Dr. Winkelmann or direct from the Institute.

General Atlas Moves Headquarters

Effective October 1, the New York offices of the General Atlas Carbon Division of the General Properties Co., Inc., will be closed and all of the division's activities will be concentrated at the plant in Pampa, Texas. No other changes in management or personnel are involved, according to Carl J. Wright, vice-president of the company, and the firm of Herron & Meyer, of Akron, Ohio, will continue as sole sales representatives. Mr. Wright's headquarters will be at Pampa.

LOS ANGELES NEWS

Although the program for the first fall supper meeting of the Los Angeles Rubber Group is not completed at this writing, Charles Roese (Goodyear), chairman of the program committee, announces that a "good time will be had by all" at this meeting which will be held at the Mayfair Hotel (Rainbow Room) on Tuesday, October 6. One thing assured for the program is the showing of moving picture films taken at the annual group outing at the Uplifters' Club this summer.

Gaelen K. Norton (Kirkhill), president, holds over until the end of the calendar year and he looks forward to a good series of fall programs. It was anticipated that completed programs would be put in the mail before September 20.

The Pacific Moulded Products Company, 6622 McKinley Avenue, which opened for business only ten weeks ago, found it necessary early in September to increase capacity more than 50 per cent. V. S. Anderson, the proprietor, completed installation of five new presses on September 5 and was looking for a 40-inch mill. The plant, now devoting all of its capacity to synthetic rubber products, has from the first been running 24 hours per day and seven days in the week. The plan is to devote some capacity to plastic products as soon as is possible.

The Reeves Rubber Company, which was established recently at San Clemente, 60 miles south of Los Angeles on the coast, for the purpose of manufacturing parts for orthopedic shoes, is running at capacity, according to latest reports.

The Arrowhead Rubber Company has taken a lease on the plant of the Typrene Roller Company and Clark W. Tyler, executive head of this latter company, has been retained as manager. The Typrene Roller Company until recently had been devoting most of its capacity to the manufacture of printer's rollers. The location of the plant is at 5511 Wilmington Boulevard.

T. Kirk Hill, president of the Kirkhill Rubber Company, was scheduled to leave September 19 for Kenmare, North Dakota, and neighboring points in Saskatchewan to spend 10 days hunting prairie chickens. He was to be accompanied by Joe Purnell, salesman. The plan was to go by train and return by plane. Last year Mr. Hill made the same trip and brought back the canned carcasses of most of the prairie chicks previously existent in that area. This writer, who hails from North Dakota originally, had a taste of home out of one of those cans and is hoping for another such taste this year.

Word has been received of the safe arrival in England of G. G. Balasz, formerly head chemist at the local Goodyear plant. Mr. Balasz has been connected with the company's plant at Wolverhampton, England, for some years but spent a vacation in America this summer.

Among those attending the convention of the A. C. S. in Buffalo from Los Angeles were Vic Vodra (Vanderbilt) and Bill Haney (Kirkhill). No doubt there were others but this writer has failed to run them down at this writing. Mr. Haney went on to New York, Boston and Washington on business for Kirkhill.

Charles Lamb, Sr., vice-president and general manager of the West American Rubber Company, reports that his wife who has been seriously ill in a Pasadena hospital for many months has at last recovered sufficiently to return to her home.

Bruce Atkinson, formerly secretary to Frank Steele, general superintendent of the Goodyear plant, has been transferred to the staff of the personnel department. He will also be editor of the *Wingfoot Clan*, succeeding Howard Richards, who has joined the United States Navy.

More than 98 per cent of the employees at Goodyear have signed up for war bond purchases on the salary reduction plan. In a recent drive the percentage was boosted in one week from 55 per cent to this almost perfect figure.

W. F. Sturdivant, one of the four proprietors of the Los Angeles Standard Rubber Company at 1280 East Slauson Avenue, has returned from a trip to Washington, New York and other eastern cities. He was gone about 3 weeks.

Fred Woerner, head chemist for the Los Angeles Standard Rubber Company, has returned from a trip to Denver where he attended a conference of the Society of Automotive Engineers. The theme of the meeting was specifications.

The Faulhaber Rubber Company has practically gone out of the rubber business, save for curing jobs done for other rubber manufacturing concerns, and has gone into the manufacture of aeronautic and marine plywood. The company is especially equipped for this with the largest hydraulic steam press on the Pacific coast. The press can handle the largest sheets of plywood likely to be needed. A new low pressure system for lifting the press has been installed while the down thrust pressure has been stepped up to 2,500 lbs. per square inch. Other new installations include a gas burner for the boiler with an oil system retained as a stand-by. Three presses and one mill used in rubber appliance manufacture have been sold. Carl Faulhaber, the proprietor, believes the big press will be kept busy day and night for the duration on plywood. This company for years manufactured rubber floor mats and tiles.

Grover C. Berryman, Los Angeles inventor, heads a new company known as the United Rubber Company, 821 Traction Avenue, Los Angeles, a firm engaged in reclaim work with a capacity of 12,000 pounds per day. Mr. Berryman is using a process which he believes is an improvement in certain details over any other previously in use. The plant began operations September 3.

William A. Sharpe of 1433 S. Almansor Street, Alhambra, who for some months has been working on a system of increasing latex output from milkweed juice by injecting bacteria into the juice to induce fermentation, has set up a pilot plant at 604 So. Avenue 19, Los Angeles, in an abandoned brewery. Mr. Sharpe maintains that the secret of his product is bacilli imported from Brazil. D. B. Lewis is associated with Mr. Sharpe in this venture, the former being a machinery expert. The set-up is arousing considerable popular interest in Los Angeles. Milkweed grows profusely in many California valleys.

Curtis Wolter, formerly purchasing agent for the Kirkhill Rubber Company, is now connected with the purchasing department of the United States Rubber Company. Mr. Wolter was a U. S. employee before going with Kirkhill.

Carl Stentz, chemist for Avery Adhesives, 451 E. 3rd Street, and proprietor of the Latex Seamless Rubber Company, has returned from a trip through the east. He visited New York, Boston, Washington, and other eastern cities.

Gilmer Power Recovery Plan

The L. H. Gilmer Co., Tacony, Philadelphia, Penna., one of the oldest firms of rubber fabric belt specialists, is currently sponsoring the Gilmer National Power Recovery Plan. This plan, which has received the approval and commendation of WPB, is designed to stimulate the reduction of power losses in industrial plants by the adoption of minor betterments and organized systematic maintenance. The keynote of the plan is a series of power-recovery estimators which enable plant executives to determine where power losses occur and take steps to reduce such losses.

CANADIAN NEWS

In a recent report to the House of Commons, the Hon. C. D. Howe, Minister of Munitions and Supply, revealed that to date the Polymer Corporation, Ltd., has made commitments amounting to $4,000,000 and expects to make additional expenditures amounting to $40,000,000 in connection with the government owned synthetic rubber plant at Sarnia, Ontario.

The report stated in part: "It is expected that manufacturing operations will commence in the summer or early fall of 1943. About 10,000 long tons of Buna S rubber will be produced in the latter half of 1943 in a plant with an anticipated annual output of approximately 34,000 long tons. About 4,000 long tons of Butyl rubber will be produced in the last eight months of 1943 with an anticipated annual output of 6,700 long tons. It is expected that butanol required will be made in existing Canadian distilleries from grain and it will be converted into butadiene at the Sarnia plant."

Original plans called for manufacture of all of the required butadiene from refinery gases. Decision to eliminate one of the refinery units and make part of the rubber raw material from alcohol resulted from a study made by Dr. H. B. Speakman, of the Ontario Research Foundation.

Dr. Speakman is one of the newly appointed members of the Synthetic Rubber Technical Advisory Committee. Others are E. R. Rowzee, of Canadian Synthetic Rubber, Ltd., who was formerly connected with the Akron Goodyear Company; R. H. Boundy, of Dow Chemical Company; and Dr. R. V. Yohe, of the Akron Goodrich Company, who took the place of Dr. J. H. Boyd, of the Hycar Chemical Company, Akron.

George B. Rutherford has been named general manager and J. A. Porteous, assistant general manager, of the Mechanical and Sundries Division, Dominion Rubber Company, Ltd., Montreal. For many years Mr. Rutherford was sales manager of the Western Canada Division but has been in Montreal since 1938. Mr. Porteous has been with the company for seventeen years in various capacities.

W. H. Funston, Firestone Tire and Rubber Company of Canada, and A. G. Partridge, Goodyear Tire and Rubber Company of Canada, were both elected to the executive council of the Canadian Manufacturer's Association at the annual general meeting held in Toronto. W. H. Miner, of the Miner Rubber Co., Ltd., Granby, Quebec, was one of ten past presidents honored by being appointed members of the executive council.

Canadian rubber men were appointed to a number of the standing committees of the Association. The tariff committee includes L. L. McMurray, Gutta Percha and Rubber, Ltd.; D. W. Buchanan, Viceroy Manufacturing Co., Ltd.; and H. S. Ireland, Canadian General Rubber Company. The transportation committee includes Norman Boyd, Gutta Percha; and W. C. Thompson, Goodyear. T. M. Mayberry, Firestone, was appointed to the legislation committee; F. L. Freudeman, Sterling Rubber, to the membership committee; F. A. Warren, Gutta Percha, to the insurance committee; and G. W. Sawin, B. F. Goodrich, to the publishing committee.

The industrial relations committee includes E. H. Koken, Goodyear; F. A. Warren, Gutta Percha; T. M. Mayberry, Firestone; and W. H. Miner, Miner Rubber. The commercial intelligence committee includes L. L. McMurray, Gutta Percha; J. A. Eltherington, Goodyear; and W. H. Funston, Firestone.

Although Canada Wire and Cable Company has reported increased business for the six months ending June, 1942, over the same period in 1941, President H. Horsfall states that it is difficult to forecast future business and probable profits due to increasing restrictions on rubber and metals.

Operating profit for the first six months was $1,536,182 compared with $1,531,611. In spite of the larger volume of business net profits amounted to only $304,419 against $418,475 for the same period.

The Bata Shoe Company of Canada, Ltd., Batawa, Ont., is establishing a branch plant at Colborne, Ont. The new plant will utilize local labor for the company's regular shoe manufacturing activities and thus release labor in the Batawa and Frankfort areas for munitions production.

According to a recent order issued by F. C. Hayes, Administrator of Shipping Cases, no person shall make or cause to be made any rubber printing dies for printing on any solid or corrugated fiberboard shipping container without obtaining the written permission of the administrator.

Department of Munitions and Supply has issued instructions to all dealers in order to speed up complete utilization of scrap rubber.

Dealers who peel treads from used tires cannot apply them to other used tires but must turn them over to reclaim manufacturers or to the Fairmont Company, Ltd., which sells its scrap to such manufacturers.

Dealers have also been advised that they may not leave used tires or tubes lying idly around their premises. Instead, any tire or tube that can be made safe for service must be reconditioned and offered for sale. If unfit for automobile use it must be employed as repair material and any resulting scrap must be sold promptly to a reclaim manufacturer.

Although Canada had never before collected more than 12,000 tons of scrap rubber in one year, about 15,000 tons has already been recovered since the start of a salvage campaign last May. Announced goal of the campaign was 25,000 tons this year. Early in the campaign it was found that scrap dealers outside of Ontario and Quebec were not collecting rubber as freight rates were too high to make the business profitable. The government-owned Fairmont Company then undertook to handle and encourage scrap gathering in remote areas. Uniform prices are paid for carloads anywhere in Canada and the Fairmont Company absorbs that part of the freight charge not recovered from the reclaimers.

Joseph W. Holmes, Jr., formerly technical sales representative for rubber chemicals of Canadian Industries, Ltd., has joined the Polymer Corporation, Toronto, Canada's synthetic rubber agency, in the capacity of executive assistant to General Manager J. R. Nicholson.

Goodyear Develops New V-Belt

A new type of V-belt, especially adapted for the motors of tanks and armored vehicles, has been developed by the Goodyear Tire & Rubber Co., Akron. The new type belt utilizes steel wires in place of the conventional fabric or cord carcasses and is said to provide increased strength, higher resistance to heat and far less stretch than present types. These factors are termed important because of the inaccessibility of fan belts and the tremendous amounts of heat developed by powerful motors in armored vehicles.

OPA Creates Standards Division

A Standards Division has been created by OPA to provide its operating divisions with the technical assistance necessary to incorporate quality definitions in price, rent and rationing regulations. The new division will have thirteen sections in all, seven of which are already functioning, including one on rubber and rubber products. Theodore M. Miller, of Baltimore, is the acting head of the Rubber and Rubber Products Section. Mr. Miller, a consulting chemist, is a graduate of the Johns Hopkins University School of Engineering. He has served with the Holtite Rubber Co. as assistant chemist and with Foster D. Snell, Inc., acting as branch manager of the latter firm in 1936 and 1937.

OBITUARIES

Allan B. Merrill

Allan B. Merrill, associated with the B. F. Goodrich Co. for the past thirty-one years and one of the best known technicians of the company, died at the City Hospital in Akron on September 9 as the result of a stroke suffered a few days earlier at his home in Portage Lakes. He was 54 years of age.

Mr. Merrill came to Akron in 1911 to join the staff of the old Diamond Rubber Co. shortly after being graduated from the Lowell (Mass.) Textile Institute. He went to Goodrich in 1911 upon the merger of Goodrich and Diamond. He served in many executive capacities, becoming recognized as a national authority on rubber products for the oil industry.

Since last June Mr. Merrill had been manager of the postwar products development department created to prepare Goodrich's facilities for production after wartime demands ceased. For the previous ten years he had been technical superintendent of the industrial products division. Funeral services were held on September 11 with interment in Glendale Cemetery. A widow survives.

Richard A. Terhune

Richard Anderson Terhune, vice-president of the Acushnet Process Co., New Bedford, Mass., died at his home in Fair Haven, Mass., at the age of 70 on August 28. He had been in poor health for the past six months, since suffering a heart attack last February. Mr. Terhune was born in Littleton, North Carolina, but had lived in Massachusetts for approximately 30 years. He joined Acushnet Process in 1915, first acting as factory manager and later becoming vice-president. Prior to joining Acushnet Process he had been associated with the Intercontinental Rubber Co. Mr. Terhune leaves a widow, a son and a daughter.

Col. H. P. Ballard

Col. H. P. Ballard, a pioneer of the rubber footwear business and one of the oldest employees in point of service of the U. S. Rubber Co. until his retirement two years ago, recently died at his Malden, Mass., home at the age of 86. Col. Ballard came from an old Salem, Mass., family and his military title came from the Massachusetts National Guard. He entered the employ of the old Boston Rubber Shoe Co. in 1871 and was vice-president and treasurer of that company at the time of its dissolution. This was one of the companies that formed the nucleus of the present U. S. Rubber Co. At the time of his retirement from active business in 1940, he was president and treasurer of the Wellman Co. of Medford, Mass., an affiliate of U. S. Rubber. Surviving are a wife, two sons and a daughter.

William A. Conant

William A. Conant, who for many years headed the old Gossamer Rubber Company in New England, died in his summer home at Harwichport, Mass., on August 14. He was 72 years of age. Mr. Conant was a lifelong resident of Brookline, Mass., and was active in New England rubber circles. A bachelor, his immediate survivor is a cousin, Mrs. M. S. Kennedy of Buffalo, N. Y.

Surety Buys Canton Rubber Co.

The plant, equipment and all assets of the Canton Rubber Co., Canton, Ohio, have been purchased by the Surety Rubber Co., Carrollton, Ohio. The Surety plant has been operating 24 hours a day producing crude and synthetic rubber gloves for various Government agencies. The acquisition of the Canton Rubber properties will enable the company to transfer part of this production and provides increased facilities for its entire line of industrial gloves and lineman's safety equipment. S. S. Hall is president of the Surety Rubber Co.

Holds Extensive War Exhibit

The U. S. Rubber Co. held an extensive war exhibit in the ballroom of the Waldorf-Astoria Hotel in New York City early this month. Two huge barrage balloons were inflated as part of the showing which demonstrated the rapid conversion from peace to war products. One of the balloons was the new British type successfully used in defending strategic areas of England while the other was the convoy type used to safeguard vessels at sea. Other exhibits included inflatable boats, fuel cells, life-saving suits, diving dresses, and pontoons.

National Safety Council, 20 No. Wacker Drive, Chicago, has begun distribution of its 1943 Safety Calendar. The twelve paintings used stress the theme that "Safety Speeds Victory." The reverse side of each sheet supplements by picture and text the painting of the month. These calendars may be purchased from the Council in large or small lots.

EMERGENCY SPECIFICATIONS ON RUBBER SHEATH COMPOUND

In addition to a number of emergency alternate provisions which have been established in several specifications of the American Society for Testing Materials, three new emergency specifications have recently been issued, including one covering rubber sheath compound, *i.e.*, Emergency Specifications for Rubber Sheath Compound for Electrical Insulated Cords and Cables Where Extreme Abrasion Resistance Is Not Required (ES-6).

The new emergency specification for rubber sheath compound, the sixth such emergency specification issued by the Society, was developed by Committee D-10 on Rubber Products at the time the committee was setting up a number of emergency provisions in other wire and cable specifications as requirements to help in procurement. It was felt that standard requirements for a compound where extra abrasion resistance was not required would also help in conservation, and that is the primary reason for the new emergency standard.

The physical requirements for the vulcanized rubber sheath call for a minimum tensile strength of 1,800 p.s.i.; elongation at rupture of 350 min.; set in 2-inch gage length, 3/8-inch maximum; and a tensile strength after 48 hours in the oxygen bomb test of 1,400 min. p.s.i.

The National Carbon Co. is planning the construction of a plant in Ohio for the manufacture of calcium carbide, a good portion of which will be used for the production of synthetic rubber. The plant will cost between $2,500,000 and $3,000,000, and will be financed by the Defense Plants Corp.

Interscience Publishers, Inc., 215 Fourth Ave., New York, has issued a new catalog listing books which are available and which will soon be available on chemistry, biochemistry, medicine, physics, engineering, mathematics, and geology. Copies are available without cost on request.

A new "single squeeze" method by which the extraction of rubber from the guayule plant is said to be greatly facilitated is covered in U. S. Patent 2,281,336 recently granted to Matthew J. Stacom. The patent has been assigned to the Stacom Process Corp., Long Island City, N. Y.

A preparation for the preservation and waterproofing of roofs has been developed by the Master Mechanics Co., 2097 Columbus Road, Cleveland. Consisting of synthetic rubber, gums and processed oils, as well as asphalt and asbestos, the new material, known as Evanite, is brushed on and vulcanizes on application. It is said to be fire retarding and shock resistant.

Amendments to Order No. M-15-b-1

Amendment No. 14

PART 940—RUBBER AND BALATA AND PRODUCTS AND MATERIALS OF WHICH RUBBER OR BALATA IS A COMPONENT

[Amendment 14 to Supplementary Order M-15-b-1]

Section 940.5 *Supplementary Order M-15-b-1*[1] is amended as follows:

1. By striking from paragraph (b) thereof the following:

* * * or other purchase orders placed by or for the account of any other department or agency of the government of the United States. * * *

2. By changing paragraphs (b) (7), (b) (9) and (b) (10) to read as follows:

(7) Compounds for the manufacture of tires, tire casings, camelback, capping stock and tire and tube repair materials	List 7
(9) Tires and tire casings (except airplane and bicycle tires)	List 9
(10) Tire tubes for passenger automobile, truck and agricultural implement tires	List 10

3. By inserting immediately after paragraph (b) (17) thereof the following new paragraph designated (b) (18):

(18) Camelback and capping stock	List 18

4. By substituting the attached revised Lists 7, 9 and 10 for Lists 7, 9 and 10 now attached to such order.

5. By attaching thereto the following additional List designated List 18.

This order and the lists attached hereto shall become effective on August 24, 1942. (P.D. Reg. 1, as amended, 6 F.R. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Issued this 24th day of August 1942.

AMORY HOUGHTON,
Director General for Operations.

LIST 7

[Revised effective August 24, 1942]

Specifications for the manufacture of compounds for the manufacture of tires, tire casings, camelback, capping stock and tire and tube repair materials.

This revised List 7 sets forth the specifications to be used in the manufacture of tires, tire casings, camelback, capping stock and tire and tube repair materials, and is intended to furnish standards for the grades of compounds listed. Other Lists now attached and to be hereafter attached to Supplementary Order M-15-b-1 will govern the use of these compounds in the manufacture of finished products. These compounds need be used only when required by other specifications contained in lists now or hereafter attached to Supplementary Order M-15-b-1. The variations permitted by subdivision (b) of this revised list 7 are allowed in the manufacture of finished products covered by other applicable Lists unless prohibited by such other lists.

(a) *Compounds*

Description of product		Maximum percent by volume	
Type	Grade	Crude rubber	Whole tire reclaimed rubber
(1) Tread, capping stock and camelback compounds.	A	73.0	0.0
	B	59.5	17.5
	C	47.9	31.4
	D	40.4	41.3
	E	26.0	57.0
	F	0.0	89.3
(2) Friction compounds	A	88.5	1.0
	B	78.0	15.0
	C+	69.0	25.0
	C	60.0	35.0
	D	43.0	50.0
	E	19.0	73.0
	FF	6.4	85.0
	F	0.0	90.0

(b) *Variations*

(1) Variations from the above specifications are permitted as follows:

	Tread, capping stock and camelback compounds	Friction compounds
Crude rubber	Plus 0, minus 2	Plus 0, minus 5.
Whole tire reclaimed rubber.	Plus 2, minus (not limited).	Plus 5, minus (not limited).

(2) Any person may, with the prior approval of the Director General for Operations, reduce the percentages of crude rubber specified in these compounds; provided the tires manufactured therefrom bear the name of the manufacturer and, where produced to fill war orders, meet the specifications of the purchasers.

(3) With the types of formulas specified above, and with mold and gauges selected, a manufacturer can calculate the maximum amounts of crude rubber and whole tire reclaimed rubber which may be used in the manufacture of a tire or tire casing of any specified type and size. Within the maximum amounts of crude rubber and whole tire reclaimed rubber thus calculated, a manufacturer may, in his discretion, shift the amounts between friction and tread, but may not use in the manufacture of any tire or tire casing more crude rubber or more whole tire reclaimed rubber than would be used in the manufacture of such tire or tire casing if the above specifications for tread and friction were followed, after allowing for tolerance permitted.

(4) All compounded rubber in a tire, other than the tread and sidewalls, is considered as "friction", and the tread and sidewalls are considered "tread". Each tire manufacturer shall adopt minimum gauges or thicknesses in the following parts of all tires:

Sidewalls (but within the above specifications).
Plys and squeegees.
Under-tread (but within the above specifications).
Cushions and breakers.

"Minimum" as used in this paragraph (4) means the thinnest gauge which the manufacturer believes can be used without materially detracting from the performance of the tire.

(5) Any manufacturer who can use subtreads, or who can apply sidewalls separate from the tread, and who can in either of these ways save crude rubber without detracting materially from the performance of the tire shall do so, even if it requires the use of slightly more reclaimed rubber. The total amount of crude rubber which a manufacturer may use if he uses subtreads or sidewalls to save crude rubber is the amount calculated in accordance with the appropriate friction and tread formulas, less the amount which may be saved through the use of subtreads and/or sidewalls.

LIST 9

[Revised effective August 24, 1942]

Specifications for the manufacture of tires and tire casings (except airplane and bicycle tires)

(a) *For other than war orders*

(1) Except as provided in paragraphs (a) (3) and (b) hereof, the manufacture of tires and tire casings (except airplane and bicycle tires) shall be confined to the

[1] 7 F.R. 967, 2344, 2449, 2595, 2782, 3389, 4448, 5019, 5296, 5592, 5748, 5984, 6071, 6211, 6465.

sizes, plies and tread types listed below and such other sizes, plies and tread types as may be permitted by special authorization of the Director General for Operations.

The friction and the tread, respectively, of each of the sizes of tires and tire casings listed below shall be made from one of the grades of compounds listed in List 7 attached to Supplementary Order M–15–b–1, as such List may be revised from time to time, and appropriate grade of compound to be used for each respective friction and tread being that hereinbelow specified therefor opposite the description and designation of such size.

TRUCK, BUS AND SPECIAL PURPOSE TIRES

WPB size No.	Size	Ply	Tread type	Compounds to be used	
				Friction	Tread
1	9.00–13	6	Regular	C	B
2	7.00–15	6	Regular	C	C
3	6.00–16	6	Regular	C	C
4	6.50–16	6	Regular	C	C
5	7.00–16	6	Regular	C	B
6	7.50–16	6	Regular	B	B
7	7.50–16	8	Regular	B	B
8	10.50–16	10	Regular	A	B
9	10.50–16	12	Regular	A	B
10	10.50–16	12	Mud-Snow	A	B
11	6.00–17	6	Regular	C	C
12	7.00–17	8	Regular	C	B
13	7.50–17	8	Regular	B	B
14	7.50–18	8	Regular	B	B
15	8.25–18	10	Regular	A	B
16	9.00–18	10	Regular	A	B
17	10.00–18	12	Regular	A	B
18	11.00–18	12	Regular	A	B
19	6.00–20	6	Regular	C	C
20	6.50–20	6	Regular	C	C
21	6.50–20/32x6	8	Regular	C	C
22	6.50–20/32x6	8	Mud-Snow	C	C
23	7.00–20	8	Regular	C	B
24	7.00–20/32x6	10	Regular	A	B
25	7.00–20/32x6	10	Mud-Snow	A	B
26	7.50–20	8	Regular	B	B
27	7.50–20/34 x 7	10	Regular	A	B
28	7.50–20/34 x 7	10	Mud-Snow	A	B
29	8.25–20	10	Regular	A	B
30	8.25–20	10	Mud-Snow	A	B
31	9.00–20	10	Regular	A	B
32	9.00–20	10	Mud-Snow	A	B
33	9.00–20/36 x 8	12	Regular	A	B
34	10.00–20	12	Regular	A	B
35	10.00–20	12	Mud-Snow	A	B
36	11.00–20	12	Regular	A	B
37	11.00–20	12	Mud-Snow	A	B
38	12.00–20	14	Regular	A	B
39	13.00–20	16	Regular	A	B
40	9.00–22	10	Regular	A	B
41	10.00–22	12	Regular	A	B
42	11.00–22	12	Regular	A	B
43	7.00–24/36x6	10	Regular	A	B
44	7.50–24/38x7	10	Regular	A	B
45	9.00–24/40x8	12	Regular	A	B
46	10.00–24	12	Regular	A	B
47	11.00–24	12	Regular	A	B
48	12.00–24	14	Regular	A	B
49	13.00–24	16	Regular	A	B
101	8.25–20	10	Earthmover	B	A
102	9.00–20	10	Earthmover	B	A
103	10.00–20	12	Earthmover	B	A
104	11.00–20	12	Earthmover	B	A
105	12.00–20	12	Earthmover	B	A
106	13.00–20	14	Earthmover	B	A
107	14.00–20	16	Earthmover	B	A
108	16.00–20	16	Earthmover	B	A
109	18.00–24	16	Earthmover	B	A
110	18.00–24	20	Earthmover	B	A
111	21.00–24	16	Earthmover	A	A
112	21.00–24	20	Earthmover	A	A
113	24.00–32	24	Earthmover	A	A
114	24.00–32	36	Earthmover	A	A
115	36.00–40	34	Earthmover	A	A
116	8.25–20	12	Rock Service	A	A
117	9.00–20	12	Rock Service	A	A
118	10.00–20	14	Rock Service	A	A
119	11.00–20	14	Rock Service	A	A
120	11.00–24	14	Rock Service	A	A
121	12.00–24	16	Rock Service	A	A
122	13.00–24	16	Rock Service	A	A
123	14.00–24	20	Rock Service	A	A

TRUCK, BUS AND SPECIAL PURPOSE TIRES—Continued

WPB size No.	Size	Ply	Tread type	Compounds to be used	
				Friction	Tread
124	16.00–24	20	Rock Service	A	A
125	18.00–24	20	Rock Service	A	A
126	21.00–24	20	Rock Service	A	A
127	18.00–24	16	Mud-Snow	A	A
128	18.00–24	20	Mud-Snow	A	A
129	18.00–40	20	Mud-Snow	A	A
130	21.00–24	16	Mud-Snow	A	A
131	21.00–24	20	Mud-Snow	A	A
132	21.00–28	20	Mud-Snow	A	A
133	24.00–32	24	Mud-Snow	A	A
134	24.00–32	36	Mud-Snow	A	A
135	30.00–40	34	Mud-Snow	A	A
151	7.00–20	10	(Flat base) rib	B	C
152	7.00–24	10	(Flat base) rib	B	C
153	7.50–24	10	(Flat base) rib	B	C
154	9.00–24	10	(Flat base) rib	B	C
155	9.00–24	10	(Flat base) traction	B	C
156	9.00–24	10	(Drop center) traction	B	C
157	10.00–24	8	(Drop center) traction	B	C
158	11.00–24	8	(Drop center) traction	B	C
159	12.00–24	8	(Drop center) traction	B	C
160	13.00–20	10	(Drop center) traction	B	C
161	13.00–24	8	(Drop center) traction	B	C
162	14.00–20	12	(Drop center) traction	B	C
176	7.50–15	10	Regular	A	B
177	8.25–15	12	Regular	A	B
178	9.00–15	12	Regular	A	B
179	10.00–15	14	Regular	A	B

Passenger automobile tires

WPB size No.	Size	Ply	Compounds to be used	
			Friction	Tread
201	6.50–15	4	C	B
202	7.00–15	4	C	B
203	7.00–15	6	C	B
204	7.50–15	6	C	B
205	5.50–16	4	C	B
206	6.00–16	4	C	B
207	6.00–16	6	C	B
208	6.25/6.50–16	4	C	B
209	6.25/6.50–16	6	C	B
210	7.00–16	4	C	B
211	7.00–16	6	C	B
212	7.50–16	6	C	B
213	5.25/5.50–17	4	D	C
214	6.00/6.50–17	4	D	C
215	7.00–17	6	C	B
216	7.50–17	6	C	B
217	5.25/5.50–18	4	D	C
218	6.00–18	6	D	C
219	4.75/5.00–19	4	D	C
220	5.25/5.50–19	4	D	C
221	6.00/6.50–19	6	D	C
222	4.50/4.75/5.00–20	4	D	C
223	5.25/20	6	D	C
224	6.00/20	6	D	C
225	4.40/4.50–21	4	D	C
226	5.25–21	4	D	C
227	30 x 3½ Clin.	4	D	C

No limitation on tread designs.

MOTORCYCLE TIRES

251	26 x 2.25	2	C	B
252	3.25–19	4	C	B
253	3.30–18	2	C	B
254	3.50–18	2	C	B
255	3.85–18	4	C	B
256	4.00–18	4	C	A
257	4.50–18	4	C	A
258	4.00–19	4	C	A
259	4.50–19	4	C	A
260	5.00–16	4	C	A

No limitation on tread designs.

INDUSTRIAL TIRES

Description of product	Compounds to be used	
	Friction	Tread
Industrial pneumatic tires:		
Single tube—all sizes	E [1]	F
Straight side—under 6.00 (except 4.00—8 regular and H. D.)	E	F
Straight side—6.00 and up	D	C
Exception 1—4.00–8 regular	FF	F
Exception 2—4.00–8 heavy duty	D	C
Industrial solid tires:		
Stretch-on or Hollow Center	.....	F
Molded-on for hand operated vehicle.	.....	FF [2]
Molded-on for power driven or power drawn vehicles.	.....	A
Pressed-on	.....	A
Metal base demountable	.....	A

[1] Including tube.
[2] Friction grade.

(2) No person shall manufacture any size of tire in more than one regular tread design, unless such manufacturers' mold equipment for such size and tread design is insufficient for his requirements.

(3) Mileage tires for city and intercity busses may be manufactured from friction and tread compounds up to and including Grade A compound as set forth in said revised List 7, without restriction as to sizes, plies or tread design.

(4) Unless permitted by special authorization of the Director General for Operations, rayon shall not be used in the manufacture of any tires except mileage tires for city and intercity busses, and tires of WPB sizes numbers 35, 38, 42 and 53 in the number of plies specified for such sizes, and no person shall manufacture tires of WPB sizes numbers 35, 38, 42 and 53 of both cotton and rayon construction.

(5) Each tire casing, manufactured under these specifications, except tire casings manufactured to fill war orders, shall be branded on the serial side near the serial number in letters at least ½ inch high, with the words "War Tire" and the letters specifying the respective grades of compounds used in the friction and the tread.

(b) *To fill war orders*

(1) The manufacture of tires and tire casings (other than airplane and bicycle tires) to fill war orders shall be confined to the sizes, plies, tread types and compounds specified in subdivision (a) hereof and the sizes, plies, tread types and compounds listed in subdivision (b) (2) hereof, except that other sizes, plies or tread types (but not other compounds) may be used when, but only when, there is delivered to the person manufacturing the tires a certificate signed by a contracting or inspecting official of the Army Navy Maritime Commission or other governmental agency listed in subparagraphs (a) (4) (i) (aa) or (a) (4) (ii) of Supplementary Order No. M–15–b, as amended, substantially as follows:

I hereby certify that the following tires covered by purchase order No. ..... are re-

quired for direct military (or naval) use, and that tires of sizes, plies and tread types enumerated in Revised List 9 attached to Supplementary Order No. M-15-b-1, as amended, are not adequate for such purpose:

Quantity *Size* *Plies* *Tread Type*

(Insert description of tires)

Title.

For the (insert name of purchasing agency)

provided that this exception shall not apply to tractor or implement tire casings, which shall not be manufactured unless permitted by special authorization of the Director General for Operations.

(2) The friction and tread, respectively, of each of the sizes of treads and tire casings listed below shall be made from one of the grades and compounds listed in said List 7, the appropriate grade of compound to be used by each such respective friction or tread being that hereinbelow specified therefor opposite the description or designation of such size.

TRUCK AND BUS TIRES

WPB size No.	Size	Ply	Tread type	Compounds to be used	
				Friction	Tread
300	6.00-16	8	Mud-Snow N.D.	C	B
301	7.50-16	8	Mud-Snow N.D.	B	B
302	9.00-16	8	Mud-Snow N.D.	B	B
303	5.50-18	6	Regular	C	C
304	7.00-20	8	Mud-Snow N.D.	C	C
305	7.50-20	8	Mud-Snow N.D.	B	B
306	8.25-20	10	Mud-Snow N.D.	A	B
307	9.00-20	10	Mud-Snow N.D.	A	B
308	11.00-20	12	Mud-Snow N.D.	A	B
309	12.00-20	14	Mud-Snow N.D	A	B
310	14.00-20	16	Regular	A	B
311	14.00-20	16	Mud-Snow N.D	A	B
312	10.00-22	12	Mud-Snow N.D	A	B
313	11.00-24	12	Mud-Snow N.D	A	B
314	14.00-24	16	Regular	A	B
315	14.00-24	16	Mud-Snow N.D	A	B
317	14.00-24	24	Regular	A	B
318	6.50-10	6	Regular	C	C
319	8.25-15	14	Regular	A	B

(3) The friction and the tread, respectively, of other sizes, plies and tread types not specified in subdivision (a) (1) and (b) (2) hereof shall be made from one of the grades of compounds listed in said List 7, the appropriate grade of compound to be used for each respective friction or tread being that hereinbelow specified therefor opposite the description or designation of such class: *Provided*, That no tractor or implement tire casings shall be manufactured unless permitted by special authorization of the Director General for Operations.

Description of product	Compounds to be used	
	Friction	Tread
13-24 inch rims, size 7.00 and smaller, 8 ply and less	C	C
13-24 inch rims, size 7.50, 8 ply and less	B	B
13-24 inch rims, size 8.25 and larger, 10 ply and more	A	B

(4) The skid depth of tires with mud-snow approved non-directional type treads shall be as follows:

Tire size	Actual mold measurements in inches
8.25-10	0.585
9.00-13	.62
15- and 16-inch rims:	
6.00	0.80
6.50	.82
7.00	.535
7.50	.56
8.25	.585
9.00	.62
10.00	.645
11.00	.67
20-, 22- and 24-inch rims:	
6.00	.50
6.50	.52
7.00	.535
7.50	.56
8.25	.585
9.00	.62
10.00	.645
11.00	.67
12.00	.70
13.00	.74
14.00	.80

Variations from the above measurements shall be permitted to the extent of 0.01 inch plus or minus throughout the mold.

(5) The outside diameter of tires with mud-snow approved non-directional type treads shall be as follows:

Tire dimension		Outside diameter in inches—inflated tire	
Diameter	Section	Minimum	Maximum
16-inch rims	6.00	28.60	28.80
	7.50	31.40	31.60
	9.00	35.00	35.30
	10.00	36.50	35.90
20-inch rims	7.00	35.60	35.90
	7.50	36.50	36.90
	8.25	38.10	38.40
	9.00	40.10	40.50
	10.00	41.00	41.50
	11.00	42.80	43.30
	12.00	44.20	44.70
	14.00	48.30	48.90
24-inch rims	14.00	52.30	52.90

(6) Standard tread radii of mud-snow approved non-directional type treads shall be between 80 and 95% of the line cross-section width of the Tire and Rim Association's standard tire sections.

(7) Run-flat combat tires to fill war orders may be manufactured in any sizes, plies and tread designs, and from any friction and tread compounds up to and including A grade compounds as listed in said List 7.

(8) Unless permitted by special authorization of the Director General for Operations, rayon shall not be used in the manufacture of any tires (including tires of the kinds and sizes referred to in subdivision (a) (4) of this revised List 9) to fill any war order, except run-flat combat tires.

(9) Where mud-snow tread is specified for a war order, the tire manufacturer shall use mud-snow N. D. molds in all cases in which he has mud-snow N. D. mold equipment of the proper size or sizes.

(e) *Definition*

Where used in this revised List 9: "regular" as applied to tread type means standard "100" level, on-the-road type.

LIST 10

[Revised effective August 24, 1942]

Specifications for the manufacture of passenger automobile, truck and agricultural implement tire tubes.

These specifications shall apply to all orders, including war orders.

No tire tube of any of the classes listed below shall be manufactured with a material volume in excess of the volume specified for such class as set forth below opposite the description or designation of such class.

Description of product type	Size	Maximum material volume (in cubic inches)
Passenger automobile tire tubes	5.50-16	51.2
	CD 16	57.8
	6.50-15	66.6
	7.00-15	72.2
	D-16	72
	7.50-15	89.4
	7.50-16	93.2
	A-20/21	42.8
	B-17/18	46.9
	C-17	56.1
	7.00-17	75.2
	7.50-17	93.4
Truck tire tubes 15- and 16-inch rims	6.00-16	65
	6.50-16	75
	7.00-15	85
	7.00-16	89
	7.50-15	103
	7.50-16	108
	9.00-16	191
	10.00-16	220
Truck tire tubes 20-inch rims or larger	6.00-20	75
	6.50-20	102
	7.00-20	135
	7.50-20	175
	8.25-20	197
	9.00-20	235
	10.00-20	300
	11.00-20	380
	12.00-20	450
	13.00-20	525
	14.00-20	670
Agricultural equipment tire tubes	4.00-12	25.3
	5.00-15	38.6
	6.00-9	36.8
	6.00-16	59.0
	DM 16	70.5
	6.50-32	137.8
	FM-24	153.5
	9.00-28	223.0
	HM 28	302.0
	KM 28	414.0
	5-40	92.5
	5.5-40	92.5
	6-40	118.0
	7-32	112.0
	8-32	157.0
	9-32	220.0
	10-28	242.0
	11-28	302.0
	12-30	385.5
	13-30	440.0
	14-30	498.0
	15-30	595.0
Lend-lease regular tire tubes	9.00-13	145
	10.50-16	250
	12.00-20	450
	13.50-20	670

Variations from the above maximum volumes shall be permitted to the extent of minus 3 per cent.

Sizes not specifically set forth shall have maximum volumes proportionate to the sizes listed.

In the event that the maximum volume herein permitted for a tube of a given type and size manufactured by any person on the effective date of this order is less than the maximum indicated above, such person shall make no change in the maximum volume of such tube as then manufactured by him without the prior approval of the Director General for Operations.

The foregoing restrictions on material volume of tire tubes shall not apply to tire tubes for use with mileage bus or run flat or combat tires.

LIST 18

Specifications for the manufacture of camelback and capping stock.

(1) *Applicability of specifications.* The specifications set forth in this List 18 shall apply to all purchase orders, including war orders.

(2) *General restriction.* Unless permitted by special authorization of the Director General for Operations, no size or type of either camelback or capping stock shall be manufactured unless such size or type (of camelback or capping stock, as the case may be) is mentioned in this List 18.

(3) *Compounds.* All references in this List 18 to grades of compounds refer to grades of compounds listed in List 7 attached to Supplementary Order No. M-15-b-1, as such List may be revised from time to time.

(4) *Sizes.* Capping stock and camelback shall be manufactured only in gauges of 10/32, 12/32, 14/32, 16/32, 18/32, 20/32, 22/32 inches and larger.

(5) *Passenger-type capping stock.* Passenger-type capping stock shall be manufactured only from compounds of Grade F, and may be faced with a compound of any of the gauges listed below, provided that such compound of any such gauge shall not contain more crude rubber by weight than the percentages set forth opposite such gauge.

Gauge:	Percentage of crude rubber
.012	54
.013	51
.014	48
.015	45
.016	42
.017	39
.018	36

(6) *Truck-type capping stock.* Truck-type capping stock shall be manufactured only from compounds of Grade C.

(7) *Truck-type camelback.* Truck-type camelback designed for retreading road building and road grading tires shall be manufactured only from compounds of Grade C.

(8) *Heavy-duty capping stock and heavy-duty camelback.* Heavy-duty capping stock and heavy-duty camelback designed for recapping and retreading mileage bus tires, or rock service tires of a cross-section of 8.25 inches or more may be manufactured from compounds of Grade A.

(9) *Airplane capping stock and camelback.* Capping stock and camelback designed for recapping and retreading airplane tires may be manufactured from compounds up to and including Grade A.

Amendment No. 15

PART 940—RUBBER AND BALATA AND PRODUCTS AND MATERIALS OF WHICH RUBBER OR BALATA IS A COMPONENT

[Amendment 15 to Supplementary Order M-15-b-1]

Section 940.5 *Supplementary, Order M-15-b-1* is amended as follows:

1. By inserting immediately after paragraph (b) (18) thereof the following new paragraph designated (b) (19):

(19) Rubber covered rolls (except washing machine wringers, printer, finger print and business machines), List 19.

2. By attaching thereto the attached list designated List 19. (P.D. Reg. 1, as amended, 6 F.R. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Issued this 15th day of August 1942.

AMORY HOUGHTON,
Director General for Operations.

LIST 19

Specifications for the manufacture of rubber covered rolls

(Except washing machine wringers, printer, finger print and business machines)

No person shall consume crude rubber, latex, reclaimed rubber, scrap rubber or synthetic rubber in the manufacture of rubber covered rolls enumerated below in subdivision (b) of this List 19 except in accordance with the specifications herein prescribed.

(a) *Compounds*

(1) RUBBER COMPOUNDS

Grade	Maximum percent by volume	
	Crude rubber	Total RHC
M-C	85	85
M-D	80	80
M-E	75	75
M-F	70	70
M-G-1	65	65
M-H-2	60	80

(2) SYNTHETIC RUBBER COMPOUNDS

Grades			Total SRV
Butadiene	Chloroprene	Polysulfid	
		M-ST-2	85
M-SB-5	M-SN-5		70

NOTE 1: The total rubber hydrocarbon (RHC) is the sum total of crude rubber and the average rubber value of reclaimed rubber expressed on a volume basis.

NOTE 2: The total synthetic rubber value (SRV) is the total synthetic rubber expressed on a volume basis.

NOTE 3: Where crude rubber or reclaimed rubber is mixed with synthetic compounds or where a mixture of synthetics is used, the R. H. C. volume plus the S. R. V volume shall not exceed the maximum S. R. V. by volume of the grade specified.

NOTE 4: Compounds of lower rubber and rubber hydrocarbon (RHC) content may be used in manufacturing rubber covered rolls listed in this List 19, provided the physical and service requirements, where specified, are met.

(b) *Rubber covered rolls*

(1) Roll covering compounds for each of the types of rolls listed in Table A below shall be made from the grade of compounds (as listed in subdivision (a) (1) and (a) (2) of this List 19) specified for such type in Table A.

Table A

Pusey & Jones Plastometer (hardness—1/8" ball):	Grade of compound
Above 220	M-C, M-SB-5, M-SN-5 or M-ST-2.
180-220	M-D, M-SB-5, M-SN-5 or M-ST-2.
90-180	M-E, M-SB-5, M-SN-5 or M-ST-2.
60- 90	M-F, M-SB-5, M-SN-5 or M-ST-2.
0- 60	M-G-1, M-SB-5, M-SN-5 or M-ST-2
Base rubber for rolls of all hardnesses	M-H-2.

(2) The cover thickness of each of the types of rolls listed in table B below shall not exceed that specified for such type in table B.

Table B

Industry	Type of roll	Maximum cover thickness
Paper		
Group I	Press, smoothing, sizing, lump breaker, breast pad.	3/4" on rolls up to and including 24" core diameter. 1 1/4" on rolls of larger core diameter.
	Waxing—all types	3/4".
	Baby, monkey and primary press.	When used as top roll 3/4"; when used as bottom roll 1/2".
Group II	Suction press	3/4".
	Couch, including cylinder wet machine and extractor.	1 3/4".
	Couch, for deckers, thickeners, save-alls, and washers.	1/2".
	Felt, table, wire carrier, guide.	3/4".
	Worm felt	3/4" over-all.
	Draw cutters (wormed).	1 1/2" over-all.
	Coating	1".

NOTE 1: Coverings for the classes of rolls described in Group II above may be applied only to cores already in use as a component part of the machine. No new cores for existing or new machines may be covered with rubber.

NOTE 2: Embossing rolls shall not be rubber covered.

[Textile industry for dyeing, bleaching and finishing industry]

Type of roll	*Maximum cover thickness, inch*
For flat goods service:	
Top rolls—all types	5/8
Bottom rolls	3/8
For rope form and warp yarn service:	
Top rolls—all types	3/4
Bottom	3/8
For other services, including jig, beam, immersion guide, and where protective covering against corrosive chemicals is required	1/4

NOTE: Wool scouring rolls may be made to existing dimensions.

Tanning Industry

Type of roll	*Maximum cover thickness, inches*
Splitting machines	1
Setting-out, buffing, fleshing, putting-out, unhairing	3/4
Wringer, shaving, breast and staking	1/2
Steel mills	
Electrolytic and tinning	5/8
Scrubber	1 1/2
Carrier and support	1
Dancer and immersion	3/4
Acid	3/8
Pinch	1 1/2
Polishing	1 1/4
Bonderizing	3/4

NOTE: On all rolls where ends, shafts or shoulders are protected from corrosion with coverings, the thickness shall not exceed 1/4". For all other industrial rolls (except those excluded in the caption of this List 19) a thickness of covering in excess of 3/4" maximum is prohibited.

Supplementary Order M-15-b, As Amended

PART 940—RUBBER AND BALATA AND PRODUCTS AND MATERIALS OF WHICH RUBBER OR BALATA IS A COMPONENT

[Supplementary Order No. M-15-b, as amended August 25, 1942]

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[Supplementary Order M-15-b, as amended August 25, 1942]

Supplementary Order No. M-15-b (including all prior amendments thereto) is hereby revised to read as follows:

The fulfillment of the requirements for the defense of the United States has created a shortage in the supply of rubber and balata for defense, for private account and for export; and the following order is deemed necessary and appropriate in the public interest and to promote the national defense:

§ 940.3 *General Limitation Order M-15-b*—(a) *Definitions.* For the purposes of this order:

(1) "Crude rubber" means all forms and types of crude rubber (including crepe rubber for soles or any other purpose) but does not mean or include balata, gutta-percha, gutta siak, gutta jelutong, pontianac, reclaimed rubber, scrap rubber or latex.

(2) "Latex" means the rubber solids contained in liquid latex in crude form, and in compounded liquid latex (but not the rubber solids in shoe adhesives and container sealing compounds).

(3) "Scrap rubber product" means any finished rubber product or part thereof, made in whole or in part from crude rubber, latex, synthetic rubber, scrap rubber or reclaimed rubber, which through wear, deterioration or obsolescence has served its primary purpose in its present state, but does not mean or include a repairable tire, treadable tire or any other manufactured product which is still usable for the primary purpose for which it was designed.

(4) "In-process scrap" means any material which is produced in the course of manufacture (including the repair, retreading or recapping of tires), and any defective or factory rejected materials or products which are not usable for the primary purpose for which they were designed and which contain any crude rubber, latex, synthetic rubber, scrap rubber or reclaimed rubber, including all types and grades of residues, such as cuttings, trimmings, tuber heads, flash, cut edgings, sweepings, dust, buffings, sawings, grindings, drippings and any other form of rubber whether vulcanized or unvulcanized, which results from or is incident to the processing of crude rubber, latex, synthetic rubber, scrap rubber or reclaimed rubber in the manufacture or repair of any product, but does not mean or include uncured friction scrap, reclaimed rubber or any finished rubber products.

(5) "Uncured friction scrap" means any scrap rubber which contains fabric and which is produced in the manufacture of tires, hose or belting before such products are finally vulcanized.

(6) "Scrap rubber" means and includes any scrap rubber product, in-process scrap or uncured friction scrap.

(7) "Reclaimed rubber" means any vulcanizable material derived from the processing or treatment of scrap rubber.

(8) "Repairable tire" means a pneumatic tire or tire casing which has sufficient tread design or under tread to warrant repair for use for the purpose for which it was primarily designed. For the purposes of this definition:

(i) "Repair" means a vulcanized sectional repair, or vulcanized reinforcement or vulcanized spot repair which can be accomplished in accordance with recognized commercial practice and which can be reasonably expected to render satisfactory service under limited operating conditions (speed under 40 MPH and no overload) so that the tire when repaired will be in a safe condition for service.

(ii) The tread and sidewall must not be severely weather checked or cracked to the extent that the tire has more than two radial cracks which extend through the cord body.

(iii) The cord body:

(*a*) Must not have separation between plies.

(*b*) Must not have been damaged to the extent that cords are pulled loose beyond the first inside ply.

(*c*) Must not have any fabric injuries that exceed one-half the cross-sectional diameter of the tire. Example—Injuries in 600/16 (6 inch) tires must not be more than three inches long on the inside of the tire: in 10.00/20 tires not more than five inches.

(*d*) Must not have or show evidence of having had more than three injuries requiring sectional repairs.

(*e*) Must not have injuries below any point where the top of the rim flange makes contact with the tire.

(*f*) Must not have or exhibit circumferential or flex breaks on the inside ply.

(*g*) Bead area must be sound with no broken wires.

(9) "Treadable tire" means a pneumatic tire or tire casing which warrants repair and retreading or recapping for the purpose for which it was primarily designed in accordance with recognized commercial practice, and which can reasonably be expected to render satisfactory service under limited operating conditions (speed under 40 MPH and no overload). For the purpose of this definition:

(i) The cord body:

(*a*) Must not be worn through more than one body ply for a total length of more than four inches on four ply tires.

(*b*) Must not be worn through more than two plies for a total length of more than four inches on tires of six plies or more.

(*c*) Must not have or show evidence of having had more than two injuries each not exceeding one-third the cross-sectional diameter of the tire. Example—Breaks in 600/16 (6 inch) tire must not be more than two inches long on the inside of the tire: 900/20 (9 inch) tires not more than three inches long.

(*d*) Must not have more than three radial cracks of more than one inch in length extending to the cord body.

(ii) The tire must in all other respects than specified in this paragraph (a) (9) conform to the requirements of a repairable tire.

(10) "Scrap consumer" means any person who consumes scrap rubber in the manufacture of any finished or partly finished product or material, and includes any person producing reclaimed rubber from scrap rubber, but does not include any person who separates scrap rubber or tears, splits or pulls scrap rubber apart (such as splitting tires) for the purpose of selling the component parts thereof to Rubber Reserve Company or to a scrap dealer.

(11) "Scrap dealer" means any person (other than a scrap consumer) buying, selling or collecting scrap rubber.

(12) "Synthetic rubber" means any of the varieties of compositions generally known as synthetic rubber, including, but not limited to, butadiene types, chloroprene, organic polysulfids and butyl.

(13) "Balata" means any of the gums of recognized commercial grades having a gutta hydrocarbon base and a high resin content, procured from wild forest trees of the Mimusops genus and closely related genera generally found in South and Central America from the Amazon Valley north through Panama, and includes such gums whether in crude or refined (deresinated or partly deresinated) form; but does not mean or include scrap balata or reclaimed balata.

(14) "Inventory" means crude rubber, latex, scrap rubber, reclaimed rubber or balata, or products thereof, in the form of raw materials, semi-processed materials, finished parts or sub-assemblies.

(15) "Consume" means to use, process, stamp, cut, or in any manner make any substantial change in the form, shape or chemical composition of any crude rubber, latex, scrap rubber, reclaimed rubber or balata.

(16) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not.

(17) "War order" means:

(i) Any contract or purchase order for material or equipment to be delivered to, or for the account of, the Army or Navy of the United States, the United States Maritime Commission, the Panama Canal, the Coast and Geodetic Survey, the Coast Guard, the Civil Aeronautics Authority, the National Advisory Committee for Aeronautics, or the Office of Scientific Research and Development, but not to or for the account of any post exchange, ship's store, commissary, officer's mess, officers', non-commissioned officers' or enlisted men's club, or any similar agency or organization.

(ii) Any contract or purchase order placed by any agency of the United States for material or equipment to be delivered to, or for the account of, any foreign country under the provisions of the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States" (Lend-Lease Act).

(iii) Any contract or purchase order for material or equipment required by the person placing the same to fill his contracts or purchase orders on hand, provided such material or equipment is to be physically incorporated in material or equipment to be delivered under contracts or purchase orders included under (i) and (ii) of this paragraph (a) (17).

(b) *Restrictions on consumption of crude rubber, latex, reclaimed rubber, scrap rubber and balata*—(1) *Crude rubber.* Crude rubber may be consumed only:

(i) To fill war orders; but only in the manufacture of those products set forth in Schedule I attached to this order.

(ii) To manufacture those groups of products set forth in Schedule II–A attached to this order; but only upon receipt of authorization from the Director General for Operations:

(2) *Latex.* Latex may be consumed only:

(i) To fill war orders; but only in the manufacture of those products set forth in Schedule I attached to this order.

(ii) To manufacture those groups of products set forth in Schedule II–B attached to this order; but only upon receipt of authorization from the Director General for Operations.

(3) *Reclaimed rubber.* Reclaimed rubber may be consumed only:

(i) To fill war orders; but only in the manufacture of those products set forth in Schedule I attached to this order.

(ii) To manufacture those products set forth in Schedules II–A or II–B attached to this order and not set forth in Schedule II–C attached to this order; but only where special authorization for the consumption of crude rubber or latex to manufacture such products has been issued by the Director General for Operations.

(iii) To manufacture those groups of products set forth in Schedule II–C attached to this order which are also set forth in Schedule II–A or Schedule II–B attached to this order, whether or not mixed or compounded with crude rubber, latex or scrap rubber; but only upon receipt of authorization from the Director General for Operations for the consumption of the respective amounts of crude rubber, latex, reclaimed rubber and scrap rubber to be consumed.

(iv) To manufacture those groups of products set forth in Schedule II–C attached to this order and not set forth in Schedules II–A or II–B attached to this order; but only upon receipt of authorization from the Director General for Operations.

(4) *Scrap rubber.* Scrap rubber may be consumed only:

(i) To fill war orders; but only in the manufacture of those products set forth in Schedule I attached to this order.

(ii) To manufacture those products set forth in Schedule II–A or II–B attached to this order and not set forth in Schedule II–C attached to this order; but only where special authorization for the consumption of crude rubber or latex to manufacture such products has been issued by the Director General for Operations.

(iii) To manufacture those groups of products set forth in Schedule II–C attached to this order which are also set forth in Schedule II–A or Schedule II–B attached to this order, whether or not mixed or compounded with crude rubber, latex or reclaimed rubber; but only upon receipt of authorization from the Director General for Operations for the consumption of the respective amounts of crude rubber, latex, reclaimed rubber and scrap rubber to be consumed.

(iv) To manufacture those groups of products set forth in Schedule II–C attached to this order and not set forth in Schedule II–A or II–B attached to this order; but only upon receipt of authorization from the Director General for Operations.

(v) To manufacture reclaimed rubber.

(vi) As to in-process scrap or uncured friction scrap generated after March 31, 1942, by the person who generated such in-process scrap or uncured friction scrap; but only in the manufacture of any products of the group (as set forth in said Schedules II–A, II–B and II–C) in which is listed the product in connection with which such in-process scrap or uncured friction scrap was generated. In such case the in-process scrap or uncured friction scrap consumed shall not be charged against his quota or allotment of crude rubber, latex, reclaimed rubber or

scrap rubber for making products of that group. Any person may consume in-process scrap or uncured friction scrap whether generated by him or not, in the manufacture of any products not so listed in the same group when, but only when, he has received from the Director General for Operations an authorization to consume reclaimed rubber or scrap rubber in the manufacture of such other group of products, and in such event the in-process scrap or uncured friction scrap consumed shall be within the limits of such authorization and shall be charged against his quota or allotment of reclaimed rubber or scrap rubber for manufacturing such other group of products.

(5) *Balata.* Balata shall be consumed only:

(i) To manufacture self-sealing fuel cells to fill war orders.

(ii) For such other purposes as may be permitted by special authorization of the Director General for Operations.

(c) *General provisions*—(1) *Distribution of crude rubber, latex, reclaimed rubber, scrap rubber and balata among plants.* Each company (which term when used in this subparagraph shall include any corporation together with all other corporations controlling, and all other corporations controlled by, such corporation) which is a processor of crude rubber, latex, scrap rubber, reclaimed rubber or balata and which operates plants in more than one community (all plants operated by the same company in the same community being herein collectively referred to as a "unit"), shall immediately upon distributing crude rubber, latex, scrap rubber, reclaimed rubber or balata during any calendar month among its units in proportions differing from the proportional distribution throughout such units during July, 1941, file with the Rubber and Rubber Products Branch of the War Production Board, a full report thereof showing clearly the reasons for such change in proportional distribution throughout its units. In any case in which it appears that such change in ratio was not justified or proper, the Director General for Operations may take such action as he deems appropriate.

(2) *Manufacture according to specifications.* Any of the products or materials whose manufacture is permitted by this order or by special authorization of the Director General for Operations shall be manufactured only in conformity with specifications now or hereafter set forth in lists attached to § 940.5 *Supplementary Order M–15–b–1* or such other specifications as may be issued by the Director General for Operations; provided that until specifications for particular products or groups of products are issued by the Director General for Operations, the crude rubber, latex or balata content by weight of any such products manufactured by any person shall not exceed the respective crude rubber, latex or balata content by weight of similar products manufactured by such person on the most recent date prior to September 1, 1942, on which he manufactured such products.

(3) *Limitation on consumption to fill war orders.* No person shall consume more crude rubber, latex, reclaimed rubber, scrap rubber or balata to fill any war order than is required for delivery within sixty days from the date such crude rubber, latex, reclaimed rubber, scrap rubber or balata is consumed under the delivery dates specified in the purchase order placed with him.

(4) *Limitation of inventories.* No person other than Rubber Reserve Company shall purchase, accept delivery of or otherwise acquire any crude rubber, latex or balata or products thereof, or any products of reclaimed rubber or scrap rubber, in the form of raw materials, semi-processed materials, finished products or parts or sub-assemblies in quantities which shall result in such person having an inventory of such material or products in excess of a minimum practicable working inventory, taking into consideration the limitations placed by this order on the production of products made of crude rubber, latex, balata, reclaimed rubber and scrap rubber. An inventory of crude rubber, latex or balata which can reasonably be expected to last more than sixty days shall be deemed to be in excess of a minimum practicable working inventory. The limitation on inventories imposed by this paragraph (c) (4) and by § 944.14, *Priorities Regulation No. 1*, as amended, shall not apply to inventories of reclaimed rubber held or acquired by persons engaged in the business of reclaiming rubber or by consumers of reclaimed rubber, it being contemplated that persons engaged in the business of reclaiming rubber and consumers of reclaimed rubber may accumulate such inventories of reclaimed rubber as they may deem advisable.

(5) *Restriction on the acquisition of crude rubber, latex, reclaimed rubber, scrap rubber and balata.* No person other than Rubber Reserve Company shall purchase, accept delivery of or otherwise acquire any crude rubber, latex, reclaimed rubber, scrap rubber or balata for any purpose except for the purpose of consuming the same in the manufacture of a product or products for which such material may be consumed under the provisions of this order or under special authorization of the Director General for Operations, provided that nothing in this order shall prevent any scrap dealer from acquiring scrap rubber in the usual course of his business for the purpose of selling the same to another scrap dealer or to Rubber Reserve Company.

(6) *Restriction on the sale of crude rubber, latex, reclaimed rubber and balata.* No person shall sell, trade or transfer the ownership of any crude rubber, latex, reclaimed rubber or balata, and no person shall accept any such sale, trade or transfer of ownership, except (i) as may be expressly permitted by regulations prescribed by Rubber Reserve Company, or (ii) in those cases in which special authorizations may be issued by the Director General for Operations; provided that nothing in this paragraph (c) (6) shall be deemed to prohibit the sale of unvulcanized rubber products or products made from balata which were in finished or marketable form on December 11, 1941, or which have become finished and marketable at any time after that date pursuant to processing not prohibited by any orders or other instructions heretofore or hereafter issued by the Director of Priorities, the Director of Industry Operations or the Director General for Operations.

(7) *General restrictions on the purchase and sale of scrap rubber.* Except (i) as may be expressly permitted by regulations prescribed by Rubber Reserve Company, or (ii) in those cases in which special authorizations may be issued by the Director General for Operations:

(*a*) No person other than Rubber Reserve Company shall sell, trade or transfer the ownership or possession of any scrap rubber to any scrap consumer.

(*b*) No scrap consumer shall purchase, receive or accept delivery of any scrap rubber, or the right to receive any scrap rubber, from any person other than Rubber Reserve Company.

(*c*) No scrap consumer shall sell, trade or transfer the ownership or possession of any scrap rubber to any person, including any scrap dealer.

Provided, That the prohibitions of this paragraph (c) (7) shall not apply to any transfer or delivery of scrap rubber from one location to another location controlled by the same person where no change of ownership takes place, or to any purchase or sale by any corporation from or to another corporation which is its subsidiary or of which it is a subsidiary, of any in-process scrap or uncured friction scrap generated by the corporation making such sale or transfer, and any such sale shall be expressly permitted within the terms of paragraph (c) (2) (iii) of Priorities Regulation No. 13 (Part 944). For the purposes hereof a corporation shall be deemed to be a subsidiary of another corporation if all or substantially all of its voting stock is owned by such other corporation.

(8) *Restriction on the destruction of tires and scrap rubber.* No person shall destroy, damage, cut or tear apart any tire, tire casing or tire tube or any scrap rubber, whether by burning or any other means and whether for the purpose of making or repairing products or materials from or with all or any of its constituent parts; provided that this restriction shall not apply to the following:

(i) The consumption of any scrap rubber in the manufacture of any product for which crude rubber, latex, reclaimed rubber or scrap rubber may be consumed under the provisions of this order or under special authorization of the Director General for Operations; but subject to such limitations as to quantities, specifications and other restrictions as may be imposed by this order or such special authorization.

(ii) The consumption of any scrap rubber by any person producing reclaimed rubber as a necessary incident to such reclaiming operations.

(iii) The destruction of any scrap rubber (without destroying the rubber therein) for the purpose of selling its component parts to a scrap dealer for resale by him either (*a*) to Rubber Reserve Company, or (*b*) under rules or regulations prescribed from time to time by Rubber Reserve Company.

(iv) The destruction of the following articles when through obsolescence, use or deterioration the articles have entirely served their usefulness in their present state:

(*a*) Used battery containers and separators and parts thereof.

(*b*) Rough bore (metal reinforced) oil suction and discharge hose and hose containing asbestos combined with rubber.

(*c*) Wire cord generally classed as lamp cord and similar wire cords (but not other insulated wire or rubber covered cable).

(*d*) That part of rubber bonded to metal which cannot be separated from the metal by mechanical means.

(*e*) Brake linings and clutch facings.

(*f*) Metal-inserted packing.

(*g*) Metal-inserted running boards.

(*h*) Gasoline pump hose.

(*i*) Friction tape and adhesive tape (except in-process scrap).

(*j*) Burnt rubber all of which has been exposed to open flame (but not scorched rubber compounds).

(*k*) Gasket compounds containing cork.

(*l*) Typewriter platens.

(v) Ordinary wear and tear incident to the normal use of any article for the primary purpose for which it was designed.

(9) *Restriction on regrooving tires.* No person shall regroove the tread or tread surface of any tire or tire casing, whether by cutting, scraping, grinding, burning, heating, remolding or any other means.

(10) *Restriction on splitting camelback and capping stock.* No person shall split, cut, tear or otherwise separate any camelback or capping stock in such manner that there will result camelback or capping stock of gauges other than 10/32, 12/32, 14/32, 16/32, 18/32, 20/32, 22/32 inches and larger.

(11) *Reports covering war orders.* No person shall consume any crude rubber, latex, reclaimed rubber or scrap rubber to fill any war order until he has forwarded to the Rubber and Rubber Products Branch of the War Production Board a report on Form PD–330, or such other form for reporting war orders as may be prescribed by the Director General for Operations. Upon forwarding such report, such person may proceed to fill the war order covered by the report unless notified to the contrary by the Director General for Operations.

(12) *Prohibited products for other than war orders.* Except to fill war orders, no person shall consume any crude rubber, latex, reclaimed rubber or scrap rubber in the manufacture of any of the products for which the consumption of such material is prohibited by Schedule III attached to this order, even though the consumption of such material would otherwise be permitted under any of the broader provisions, classifications or groupings of this order or under any of the other schedules attached to this order.

(13) *Prohibited products for war orders.* Unless permitted by special authorization of the Director General for Operations, no person shall (i) consume any crude rubber or latex in the manufacture or assembly of any of the products or materials set forth in Groups A and B of Schedule IV attached to this order for delivery to fill any war order; or (ii) consume any reclaimed rubber or scrap rubber in the manufacture or assembly of any of the products or materials set forth in Group B of said Schedule IV for delivery to fill any war order.

(14) *Index of permitted and prohibited products.* Schedule V is attached to this order for the convenience of the industry. This schedule constitutes an index of the products for which crude rubber, latex, reclaimed rubber and scrap rubber may be consumed, and those for which these materials may not be consumed, and contains appropriate cross-references to the other schedules in which such products are mentioned.

(15) *Restriction on the importation of crude rubber, latex, reclaimed rubber, scrap rubber, and balata and products thereof.* No person other than Metals Reserve Company, Defense Supplies Corporation, Rubber Reserve Company or any other corporation organized under section 5 (d) of the Reconstruction Finance Corporation Act, as amended, or any agent acting for one of them, shall, except as authorized or otherwise directed in writing by the Director General for Operations, purchase for import, import, offer to purchase for import, receive, or offer to receive on consignment for import, or make any contract or other arrangement for the importing of, any crude rubber, latex, reclaimed rubber, scrap rubber or balata, whether in crude, partly processed or processed form, or any finished or partly finished product or material made from any of the foregoing. For the purpose hereof "import" means to transport into continental United States from any foreign country or from any territory or possession of the United States, and shall include a release from the bonded custody of the United States Bureau of Customs; and products or materials shall be deemed to be made from crude rubber, latex, reclaimed rubber, scrap rubber or balata if at least ten per cent of the weight of such products or materials was made from crude rubber, latex, reclaimed rubber, scrap rubber and balata or from any one or more of them. The restriction of this paragraph (c) (15) shall not apply to the importation by any person during any calendar month of products or materials (except tires, tire casings and tire tubes) which contain an aggregate of not more than twenty-five pounds of crude rubber, latex, reclaimed rubber, scrap rubber and balata provided such products or materials are not imported for the purpose of manufacturing, processing, sale or resale.

(16) *Restriction on consumption of rubber products and materials.* No person shall use or consume any finished or partly finished product or material containing in the aggregate more than ten per cent by weight of crude rubber, latex, reclaimed rubber and scrap rubber, to manufacture for sale to others any other products for which he has not received an authorization from the Director General for Operations to consume crude rubber, latex, reclaimed rubber or scrap rubber. In any case in which any such product or material is used pursuant to any such authorization, it shall be chargeable to such person's quota of reclaimed rubber and/or scrap rubber for the manufacture of such permitted products.

(17) *Finished item deliveries.* No person shall sell, transfer or deliver, or purchase or accept or accept transfer or delivery of, any item which he knows or has reason to know was fabricated, assembled or delivered in violation of any applicable provision of this order as amended from time to time.

(18) *Applicability of Priorities Regulations.* This order and all transactions affected thereby are subject to all applicable provisions of the Priorities Regulations of the War Production Board, as amended from time to time.

(19) *Applications for authorizations to consume crude rubber, latex, reclaimed rubber and scrap rubber.* Each person who wishes to consume any crude rubber, latex, reclaimed rubber or scrap rubber at any time subsequent to October 1, 1942 to manufacture any of the products or groups of products listed in Schedules II–A, II–B and II–C attached to this order, shall file with the Rubber and Rubber Products Branch of the War Production Board an application on Form PD–407. Such application shall be filed not later than the tenth day of the month preceding the calendar month during which such person wishes to consume crude rubber, latex, reclaimed rubber or scrap rubber.

(20) *Appeals.* Any person affected by this order who considers that compliance therewith would work an exceptional and unreasonable hardship upon him, or that it would result in a serious problem of unemployment in the community, or that compliance with this order would disrupt or impair a program of conversion from nondefense to defense work, may appeal to the War Production Board by transmitting to the Rubber and Rubber Products Branch, War Production Board, Washington, D. C., an appeal on Form PD–500–b. The Director General for Operations may thereupon take such action as he deems appropriate.

(21) *Applicability of order.* The prohibitions and restrictions contained in this order shall apply to the use of material in all articles hereafter manufactured irrespective of whether such articles are manufactured pursuant to a contract made prior or subsequent to the ef-

fective date hereof, or pursuant to a contract supported by a preference rating. Insofar as any other order of the Director of Priorities, the Director of Industry Operations or the Director General for Operations heretofore or hereafter issued may have the effect of limiting or curtailing to a greater extent than herein provided the use of crude rubber, latex, scrap rubber, reclaimed rubber or balata in the production of any article, the limitations of such other order shall be observed.

(22) *Violations.* Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities' assistance.

(23) *Communications.* All reports required to be filed under this order, and all communications concerning this order, shall, unless otherwise directed, be addressed to: Rubber and Rubber Products Branch, War Production Board, Washington, D. C. Ref.: M–15–b.

(24) *General reports.* Any person who, during any calendar month, consumes, ships or stocks any crude rubber, latex, reclaimed rubber, scrap rubber or balata, or who, on the last day of any calendar month, has in his possession any crude rubber, latex, reclaimed rubber, scrap rubber or balata, shall, not later than the fifteenth day of the succeeding month, file with the Rubber and Rubber Products Branch of the War Production Board a report on the appropriate form PD–49, PD–322 or such other form or forms as may be prescribed from time to time.

(25) *Outstanding special instructions.* No unrevoked special instruction (i. e., instruction issued by individual letter or telegram and not by general order) issued prior to September 1, 1942 by the Director of Priorities, Director of Industry Operations or Director General for Operations, which (i) authorizes the consumption of crude rubber, latex, reclaimed rubber or scrap rubber within a specified period or prior to a specified date, or (ii) forbids or restricts the consumption of crude rubber, latex, reclaimed rubber or scrap rubber, is revoked or rescinded by this revised Supplementary Order No. M–15–b. All such unrevoked instructions shall remain in effect unless hereafter specifically rescinded or revoked by the Director General for Operations.

(d) *Effective date.* This order shall become effective on September 1, 1942. (P.D. Reg. 1, as amended, 6 F.R. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.).

Issued this 25th day of August, 1942.

AMORY HOUGHTON,
Director General for Operations.

SCHEDULE I

Products for which crude rubber, latex, reclaimed rubber and scrap rubber may be consumed to fill war orders. (See paragraphs (b) (1) (i), (b) (2) (i), (b) (3) (i) and (b) (4) (i) of Revised Supplementary Order No. M–15–b)

Pending the issuance of a list of products for which crude rubber, latex, reclaimed rubber and scrap rubber may be required to fill war orders, to be set forth in a revised Schedule I, crude rubber, latex, reclaimed rubber and scrap rubber may be consumed to manufacture any product to fill any war order, unless the consumption of crude rubber, latex, reclaimed rubber and scrap rubber in the manufacture of such product is prohibited by paragraph (c) (13) of Revised Supplementary Order No. M–15–b and Schedule IV attached thereto or by special direction of the Director General for Operations.

SCHEDULE II–A

Products for which crude rubber may be consumed upon authorizations issued from time to time by the Director General for Operations. (See paragraph (b) (1) (ii) of Revised Supplementary Order No. M–15–b.)

Any authorization to consume crude rubber to manufacture any group of products set forth in this Schedule II–A also authorizes the manufacture from the quota or allotment of crude rubber for that group of cements necessary to the manufacture (but not the use or application) of such products. No crude rubber shall be consumed to manufacture cements for the use or application of products of any group set forth in this Schedule II–A unless permitted by special authorization of the Director General for Operations.

Group 1

Compounds for insulating wire and cable

Group 2

Cable splicing compound

Group 3

Belt splicing and repair material
Last puller belts
Polishing belts
Screen diaphragms designed for paper making equipment

Group 4

Conveyor and elevator belting

Group 5

Flat transmission belts
Hog beater belts

Group 6

Industrial brake lining and clutch facings

Group 7

V-belts

Group 8

Acid hose
Air drill hose
Cement handling hose, including cement grouting, concrete placing and cement and dry material hose
Chemical hose
Divers' hose
Dredging sleeves
Expansion joint hose
Flexible couplings
Flanged flexible hose
Grease gun hose
Gasoline and oil tank wagon hose (not including curb pump hose)
Hydraulic control hose
Industrial vacuum hose, including dust collector, blower or exhaust hose
Jetting and hydraulic hose, including arbor pipe forming and phosphate flexible hose
Milk conveying hose
Oil suction and discharge hose
Paint spray hose
Pinch valve hose
Pneumatic hose
Railroad hose (all types)
Rotary driller's hose
Sand blast hose
Sanitary hose
Spray hose (designed for working pressures of 300# per square inch and over)
Steam hose
Suction hose
Welding hose

Group 9

Hard rubber pipe and fittings (industrial only)
Rubber buckets, pails, dippers, funnels, measures, bottles, beakers, frames, baskets, racks, trays (designed for handling corrosive materials and explosives)
Rubber insulated fume-ducts, fans, racks, frames, trays, screens, pipe, buckets, pails, dippers, agitators, funnels and measures (designed for handling corrosive materials and explosives)
Rubber pumps
Rubber lining designed for blowers, exhausters and pumps
Rubber valves and valve parts (except tire tube valves)

Group 10

Rubber lined tanks, drums, pipes and fittings (hard and soft)

Group 11

Rubber covered rolls and roll coverings (except domestic washing machine wringer, printers', fingerprint and business machine rolls)

Group 12

Press die pads

Group 13

Loom pickers

Group 14

Storage battery parts, (including only separators, retainers, binding strips, element support rods, tie rods, and hand-built jars and hand-built containers, but not including hand-built jars and containers designed for radio, farm lighting, mine safety and automotive S. L. I.)

Group 15

Hard rubber sheets, rods and tubing (designed for dielectric purposes)
Insulated tools
Magneto parts
Molded cable connectors and terminal blocks (designed for dielectric purposes)

Group 16

Mine safety battery parts
Mine safety lamp parts, excepting insulated wire

Group 16—Continued

Respirators, hose masks, gas masks, goggles, inhalators, excepting headharness (mining and industrial types)

Group 17

Sheet, strip and mechanical packings

Group 18

Oil well specialties (including only packers, testing, lining bumper and swab rubbers; blow-out preventors; drill pipe protectors; stabilizers; slush pump pistons and liners; mud and oil pump pistons, liners, valves and parts; valve cups; strippers; stuffing box rings)

Group 19

Industrial abrasive implements

Group 20

Airplane de-icer parts
Card clothing
Gas main bags
Gaskets and washers for hose
Lineman's protective devices (including only line hose, insulator hoods, blankets, cable end test caps and separators, cable bandages, lineman's sleeves and insulating stools)
Mine ventilating tubing
Molded seals for dam and lock gates

Group 21

Component parts (not elsewhere listed but not including sponge) of machinery for the processing and fabricating of raw and semi-finished materials and for the transmission of mechanical power (except as specifically prohibited in Schedule III attached to Revised Supplementary Order No. M-15-b)

Group 22

Pipe coupling rings

Group 23

Fire and mill hose

Group 24

Milk and milking machine equipment consisting of:
- Couplings for pasteurizers and milk bottle and can washers

Gaskets for milk separators and clarifiers
Milk bottle filler rubbers
Milking machine inflations and tubing

Group 25

Box die gum, rubber die gum and rubber type gum, designed for industrial marking devices only

Group 26

Engravers' rubber (excluding rubber stamps, box dies, band daters and toy stamps)

Group 27

Printing plates (excluding rubber stamps, box dies, band daters and toy stamps)

Group 28

Cutting rubbers
Finger print rolls and finger print rubber
Offset and newspaper blankets
Printers' rollers
Rubber solution for wet plate negatives
Suction cups for printers' equipment

Group 29

Automotive parts consisting of the following only:
- Air brake and vacuum brake parts, excepting boots and linings
- Air brake and vacuum brake hose
- Hydraulic brake cylinder parts, excepting boots and linings
- Hydraulic brake hose
- Hydraulic clutch and throttle controls
- Pitman arm bushings for independent suspensions

Group 29—Continued

Automotive parts consisting of the following only—Continued
- Remote control gearshift bushings
- Sealed beam gaskets
- Shock absorber bushings
- Steering post alignment bushings
- Suspension and torque arm bushings
- Steering box-to-frame pads for independent suspensions
- Torsional vibration dampers
- Windshield wiper blades and pivot to housing gaskets
- Engine, transmission and propeller center bearing mountings

Group 30

Pneumatic, solid and cushion tires, (including tubes, flaps, airbags and valves) of the following types only:
- Passenger
- Truck and bus
- Special purpose of the following types only: low platform trailer, rock service, earth-mover, road builder and road grader
- Industrial
- Motorcycle
- Airplane

Group 31

Camelback, capping stock, filler strip, stripping stock, cushion stock, lug stock, and base stock for retreading and recapping tires

Group 32

Full circle and sectional airbags designed for recapping, retreading and repairing tires

Group 33

Tire and tube repair materials (including only cushion stock, tread repair stock, cord friction, square woven fabric friction, repair patches, and tube repair gum)

Group 34

Rubber footwear designed for severe industrial use, including rubber boots, mine pacs, and work shoes all with plain or steel toes

Group 35

Rubber footwear (other than that listed in Group 34), including rubber boots, arctics, gaiters, and light and heavy rubbers

Group 36

Diaphragms designed for regulating the flow of fluids
Tank balls designed for flush valves
Bibb washers
Fuller balls
Ball cock washers

Group 37

Autopsy and mortuary gloves
Industrial all rubber gloves and industrial net-lined gloves and industrial finger cots

Group 38

Electricians' gloves

Group 39

Brain surgery caps
Colostomy outfits
Denture suctions and model formers
Dilators
Finger cots (medical, surgical, dental, veterinary, mortuary and laboratory types only)
Orthodontia bands
Parts for medical, surgical, dental, veterinary and mortuary instruments
Prostatic bags
Rubber bands and cushions designed for artificial limbs
Tubes and tubing (except fountain syringe lengths), including catheters, stopples, and rubber policemen (medical, surgical, dental, mortuary, veterinary and laboratory types only)

Group 39—Continued

Urinals designed for individual wear
Vaccine caps
X-ray sheets, gloves, aprons and cooling hose

Group 40

Surgical tape, medicated footpads and plasters

Group 41

Breast pumps
Bulbs (medical, surgical, dental, veterinary, mortuary and laboratory types only)
Medicine droppers
Water bottles and combination syringes

Group 42

Ice bags
Metatarsal cushions or pads (not parts of shoes)
Pneumatic truss pads
Truss pad covers

Group 43

Acoustic aids (soft rubber parts only) designed for individual hearing instruments and audiometers

Group 44

Hard rubber pipes, connections and accessories (medical, surgical, dental, veterinary and mortuary types only)

Group 45

Tubing, fountain syringe lengths

Group 46

Blood pressure bags
Dental dam
Dental separating strips and mouth props
Denture rubber
Inhalation bags and face pieces, not including oxygen tents (medical, surgical, dental and veterinary types only)
Invalid rings, but not including sponge rubber rings
Operating cushions, but not including sponge rubber cushions
Tourniquets

Group 47

Hospital sheeting

Group 48

Feeding nipples

Group 49

Pessaries and prophylactics

Group 50

Surgeons' gloves (medical, surgical, dental and veterinary types only)

Group 51

Meteorological balloons

Group 52

Cements designed for the repair, use or application of products permitted to be manufactured from crude rubber by Revised Supplementary Order No. M-15-b, except cements for use in the manufacture of such products, except shoe adhesives

Group 53

Commercial diving equipment

Group 54

Compounds designed for seaming protective clothing other than footwear and gloves

Group 55

Abrasive sand blasting helmets and clothing

Group 56

Conductive soles, taps and heels

Group 57

Shoe cements

Group 58

Lifesaving suits

Group 59

Compounds designed for sealing cans made of tinplate, blackplate or terneplate
Rings and compounds for sealing glass containers

Group 60

Blended compounds or mixtures designed for laboratory testing

Group 61

Vacuum cleaner belts

Group 62

Airplane equipment not elsewhere listed

Group 63

Molding bags

Group 64

Street car wheel sandwich rings

Group 65

Vibration dampers

SCHEDULE II–B

Products for which latex may be consumed upon authorizations issued from time to time by the Director General for Operations. (See paragraph (b) (2) (ii) of Revised Supplementary Order No. M–15–b)

Any authorization to consume latex to manufacture any group of products set forth in this Schedule II–B also authorizes the manufacture from the quota or allotment of latex for that group of cements necessary to the manufacture (but not the use or application) of such products. No latex shall be consumed to manufacture cements for the use or application of products of any group set forth in this Schedule II–B unless permitted by special authorization of the Director General for Operations.

Group 1

Colostomy outfits
Finger cots (medical, surgical, dental, mortuary and veterinary types only)
Prostatic bags
Prosthetic devices
Tubes and tubing (except fountain syringe lengths), including catheters (medical, surgical, dental, mortuary, veterinary and laboratory types only)
Urinals designed for individual wear

Group 2

Blood pressure bags
Inhalation bags, and face pieces, not including oxygen tents (medical, surgical, dental and veterinary types only)
Veterinary sleeves

Group 3

Industrial rubberized fabric gloves designed for handling corrosive and severely abrasive materials

Group 4

Electricians' gloves

Group 5

Dental dam

Group 6

Autopsy and mortuary gloves
Industrial all rubber gloves and industrial net-lined gloves and industrial finger cots

Group 7

Meteorological balloons

Group 8

Feeding nipples

Group 9

Pessaries and prophylactics

Group 10

Surgeons' gloves (medical, surgical, dental and veterinary types only)

Group 11

Compounds designed for sealing glass containers and cans made of tinplate, blackplate or terneplate

Group 12

Shoe cements

Group 13

Latex insulation for fume ducts, fans, racks, frames, trays, screens, pipes and fittings, buckets, dippers, funnels, measures, drums, pumps, valves, baskets, concave rollers and agitators (designed for handling corrosive materials)

Group 14

Flat transmission belts
Round transmission belts
V-belts

Group 15

Mine ventilating tubing

Group 16

Industrial abrasive implements

Group 17

Blended compounds or mixtures designed for laboratory testing

Group 18

Tire cord dip

SCHEDULE II–C

Products for which reclaimed rubber and scrap rubber may be consumed upon authorizations issued from time to time by the Director General for Operations. (See paragraphs (b) (3) (iii) and (b) (4) (iii) of Revised Supplementary Order No. M–15–b)

Any authorization to consume reclaimed rubber or scrap rubber to manufacture any group of products set forth in this Schedule II–C also authorizes the manufacture from the quota or allotment of reclaimed rubber or scrap rubber for that group of cements necessary to the manufacture (but not the use or application) of such products. No reclaimed rubber or scrap rubber shall be consumed to manufacture cements for the use or application of products of any group set forth in this Schedule II–C unless permitted by special authorization of the Director General for Operations.

Group 1

Adhesives designed for fabricating steel wool, curled hair or fibre pads for surgical corrective appliances

Group 2

Adhesives for seaming bags and bagging
Gaskets and compounds for sealing jars, tumblers, cans, drums and pails

Group 3

Athletic equipment, consisting of the following only:
- Basketball bladders
- Football bladders
- Punching bag bladders
- Soccer bladders
- Volley ball bladders
- Handballs
- Squash balls
- Tennis balls

Group 4

Automotive parts (including only spring bumpers—front and rear, tailpipe supports, battery drain tubes, brake boots, insulating forms or shapes for high tension wiring)

Group 5

Clutch facings, brake lining and brake blocks

Group 6

V-belts

Group 7

Barrel lining

Group 8

Brush setting compounds

Group 9

Molded battery containers except those designed for automotive S. L. I. batteries of S. A. E. Groups 1, 2 and 3

Group 10

Storage battery parts (except molded containers)

Group 11

Crutch tips

Group 12

Erasers and pencil plugs

Group 13

Friction tape

Group 14

Heels and heel bases (black dense composition only)

Group 15

Out soles, out soling strips, taps, top lifts and top lifting material (black dense composition only)

Group 16

Shoe bottom fillers and shoe tapes

Group 17

Insoles, midsoles and box toes

Group 18

Automotive radiator hose
Braided covered tubing
Cable covering, electric
Car heater hose
Curb line and garage air hose
Fire extinguisher tubing
Garden hose
Grease hose, low pressure, non-industrial
Pump and windshield wiper tubing
Rock wool insulation hose
Shaft covering, flexible
Spray hose (designed for working pressures under 300 pounds per square inch)
Vacuum cleaner hose
Water hose

Group 19

Parts for business machines (except platens and rolls)

Group 20

Parts for refrigerators, washing machines and motor-driven electric appliances (except hose and belts)

Group 21

Horseshoe pads

Group 22

Pressure sensitive tape

Group 23

Stamp gum

Group 24

Sponge for stamp gum cushion

Group 25

Truss pads

Group 26

Elastic fabrics and elastic webbing for:
- Artificial legs
- Gas masks
- Goggles
- Hose masks
- Inhalators and respirators

Group 26—Continued

Elastic fabrics and elastic webbing for—Con.
Edging for baby pants
Industrial shoes
Repair web
Sanitary belts
Surgical bandages, stockings and supports
Trusses (including umbilical belts)

Group 27

Spud washers
Waste and overflow washers
Float valve shank washers
Flush elbows
Flush valve washers
Force cups
Gaskets and valves designed for back flow preventors (or vacuum breakers)
Siphon washers

Group 28

Cements designed for the repair, use or application of products permitted to be manufactured from crude rubber, latex, reclaimed rubber or scrap rubber by Revised Supplementary Order No. M–15–b, except cements for use in the manufacture of such products, and except shoe adhesives.

Group 29

Tire and tube repair materials (including only cushion stock, tread repair stock, cord friction, square woven fabric friction, repair patches and tube repair gum)

Group 30

Capping stock, filler strip, stripping stock, cushion stock, lug stock and base stock for retreading and recapping tires

Group 31

Blended compounds or mixtures designed for laboratory testing

Group 32

Compounds designed for proofing fabrics, other than footwear and gloves

Group 33

Bicycle tires (including casings, tubes, flaps and valves)

Group 34

Mallets and mallet heads

SCHEDULE III

Exceptions from groups of products set forth in Schedules II–A, II–B and II–C. (See paragraph (c) (12) of Revised Supplementary Order No. M–15–b)

Unless otherwise specified in this Schedule III, no person may consume any crude rubber, latex, reclaimed rubber or scrap rubber in the manufacture or assembly of any of the products or materials listed in this Schedule III, even though the consumption of crude rubber, latex, reclaimed rubber or scrap rubber might otherwise be permitted under any of the broader provisions or classifications of products under paragraphs (b) (1) (ii), (b) (2) (ii), (b) (3) (ii) or (b) (4) (ii) of Revised Supplementary Order No. M–15–b or Schedules II–A, II–B or II–C attached to said order. (The prohibitions of this Schedule II do not apply to the manufacture of products or materials to fill war orders, as to which see Schedule IV.)

The omission of any products or materials from this Schedule III does not mean that crude rubber, latex, reclaimed rubber or scrap rubber may be consumed in their manufacture. Crude rubber, latex, reclaimed rubber and scrap rubber may be consumed in the manufacture of products or materials not listed in this Schedule III only if and to the extent permitted by Revised Supplementary Order No. M–15–b and Schedules II–A, II–B and II–C attached to said order.

Accelerator pedals (automotive)
Animal boots and shoes
Arch supports
Arm rests
Artificial leather
Basin gaskets and washers
Basin stoppers
Bath sprays
Bath tub stoppers
Battery carrier straps
Beer tubing
Blowout shoes (for tires)
Bookbinding adhesives
Bottle carriers
Bottle driers
Brake rod rattlers
Brewery hose
Brush bristles
Bumper tacks
Bunion pads
Camera bellows
Camera focusing cloth
Candy molds
Carboy pads
Casket gaskets
Chair and furniture parts
Channel filler
Christmas tree lighting devices
Chute lining
Cigar machine aprons
Cleats for athletic and sport shoes
Coated clips
Coffee maker bushings and gaskets
Concentrator belts
Contraction joint seals and concrete filler
Corn pads
Crib sheeting
Crutch pads
Cutting blocks
Cushions, upholstery and mattresses (except invalid rings and operating cushions)
Defroster parts and hose
Desk and chair protective pads
Dish drainers
Drain pipe lining
Draper aprons
Electric base plugs, plug connectors and light sockets
Elevator belt buckets and cleats
Exercise machine parts
Extension lamp handles
Fan bases and blades
Faucet caps
Faucet filters
Feeding bottle caps and covers (except nipples)
Ferrules
Filter cloth
Finger pads
Flooring, tile and tiling, and wainscoting (except conductive)
Fountain pen stock
Fly paper
Foot bath trays
Gaskets, pads and shims made from scrap tires and tubes
Gasoline curb pump hose
Gasoline tubing
Gauntlets and cuffing (except linemen's sleeves)
Gear silencers
Glue dispensers
Graphite guns and parts thereof
Grommets (except dielectric)
Handle grips (except for dielectric purposes)
Hard rubber photographic trays and development tanks (except X-Ray)
Hard rubber spatulas (except for handling explosives and corrosive materials)
Hat-forming bags
Hatters' belts
Horse shoes
Horticultural binding tape
Hose nozzles
Household gloves
Hydrometer parts
Ice cube trays
Ink wells and bottles
Instep supports
Kneeling pads
Knife handles and grips
Labels and label plasters
Lamp shades
Lawn mower tires
Leather finishes
Line tube caps
Link mats
Loom harness strapping
Lug straps, bumpers and holdups (constituting textile machinery parts)
Mallets and mallet heads (except that reclaimed rubber or scrap rubber may be used)
Marbon B (except wire and cable insulation)
Mats and matting (except conductive)
Molds for casting
Molded wheels and casters
Musical instruments and parts thereof
Oxygen tent canopies
Pacifiers
Paint brush guards
Painters' graining tools
Panelboard
Paper machine aprons
Paper padding adhesives
Pedal rubber
Photo wringers
Photographers' bulbs and tubes
Pliofilm (except for wire and cable insulation)
Plioform (except for wire and cable insulation)
Pliolite (except for wire and cable insulation)
Plywood adhesives
Post insulators
Powder bags (mining)
Pulley lagging
Recoil pads
Refrigerator freezing trays
Rock wool insulation hose (except that reclaimed rubber or scrap rubber may be used)
Rubber bands (except orthodontia bands and bands for artificial limbs)
Rubber thread
Rubberized hair and fibre (except for surgical corrective appliances)
Sand blasting stencils
Screw bumpers
Self-adhering signs
Service station signal hose
Sink and lavatory gaskets (including mack gaskets)
Sink sprays and drain stoppers
Slip joint washers
Spark plug caps
Specimen (biological) injections
Sponge applicators
Stair and step treads
Stick-on soles and taps
Stipplers
Stirrup pump hose
Stirring rods
Street sweeper belts
Street car springs
Swimming pool hose
Table tops
Tank floats
Telephone bases
Telephone cord protectors
Telephone protectors
Test tube holders
Thermometer cases
Thermos bottle parts

Thermoplastic coatings (except for wire and cable insulation)
Tire reliners
Tire and tube repair materials made from scrap tires and tubes
Toggle straps
Toilet closet outlet gaskets
Toilet closet seat bumpers
Trolley wire guard
Typewriter keys, platens, feet and covers
Typewriter and office machinery silencers
V-belt shock absorbers
Vacuum cleaner tires and bumpers
Washing machine drain hose
Weatherstripping
Wheelbarrow tires
Whiskey hose
Windlace and windlace tubing
Yarning material

SCHEDULE IV

Products for which crude rubber, latex, reclaimed rubber and scrap rubber may not be consumed to fill war orders. (See paragraph (c) (13) of Revised Supplementary Order No. M–15–b).

No person may (1) consume any crude rubber or latex in the manufacture or assembly of any of the products or materials set forth in Groups A and B of this Schedule IV for delivery to fill any war order; or (2) consume any reclaimed rubber or scrap rubber in the manufacture or assembly of any of the products or materials set forth in Group B of this Schedule IV for delivery to fill any war order; even though the consumption of crude rubber, latex, reclaimed rubber or scrap rubber might otherwise be permitted under any of the broader provisions or classifications of products under paragraphs (b) (1) (i), (b) (2) (i), (b) (3) (i) or (b) (4) (i) of Revised Supplementary Order No. M–15–b or Schedule I attached to said order.

The omission of any products or materials from this Schedule IV does not mean that crude rubber, latex, reclaimed rubber or scrap rubber may be consumed in their manufacture. Crude rubber, latex, reclaimed rubber and scrap rubber may be consumed in the manufacture of products or materials not so listed only if and to the extent permitted by Revised Supplementary Order No. M–15–b and Schedule I attached to said order.

Group A—Products and materials for which crude rubber and latex shall not be consumed

Accelerator treadle connections
Brush-setting compounds
Bumpers (automotive axle)
Bumper stripping
Cellular discs
Channel rubber (except airplane)
Combined fabrics (except flotation and lighter-than-air equipment or as otherwise specified by List 3 attached to Supplementary Order No. M–15–b–1, as amended)
Cowl vent seals and gaskets
Cowl vent hose
Dust and lever housing covers
Erasers (including typewriter)
Escalator handrails
Flyers' clothing bags (Type B 4)
Fly Paper
Foot boards (motorcycle)
Friction tape
Gym and basketball shoes (except cement and foxings)
Handle grips (except dielectric)
Labels
Mallet heads
Marbon B. (except wire and cable insulation)
Pliofilm, Plioform, and Pliolite (except moisture proof envelopes for parts for airplanes, tanks and guns and wire and cable insulation)
Recoil pads (except machine gun and eye buffers)
Rubber bands (except parts of combat equipment)
Rubberized curled hair or vegetable fibre
Sponge cushioning including seat bottoms, seat backs, armrests, handrests, parachute backs and seats and tank crash pads and linings and all other (except vision and gunsight slot pads, mask parts, ear cushions, and cushioning for cameras, flight control and fire control instruments)
Toilet closet gaskets
Toilet seat bumpers
Water, garden and lawn hose (except as specified by List 1 attached to Supplementary Order No. M–15–b–1, as amended)
Weatherstrip (except airplane)

Group B—Products and materials for which crude rubber, latex, reclaimed rubber and scrap rubber shall not be consumed

Artificial leather and upholstery
Ash trays
Athletic equipment (except clothing)
Bath sprays, sponges and soap dishes
Bumper tacks
Buttons (clothing)
Canvas water bags
Cap covers
Cartridge clip boxes
Cellular pads for crash helmet cushions
Channel filler and glazing rubber (except airplane)
Chevrons
Desk and chair protection pads
Desk sets
Dishdrainers
Door checks and bumpers (reclaimed rubber and scrap rubber may be used for airplane and automotive parts)
Door knob covers
Fan bases and blades (reclaimed rubber and scrap rubber may be used for combat tank equipment)
Faucet caps
Fender protective plates
Fender welting
Flooring (except conductive)
Fly swatters
Footbath trays
Gear shift knobs
Grommets (except airplane and dielectric)
Gun grips
Hood supports and bumpers
Hospital sheeting
Inkwells and bottles
Kneeling pads
Leather finishes
Link mats (reclaimed rubber and scrap rubber may be used for airplane walkways, pilot house, bridge deck and gun platforms)
Mastic deck covering (except repair)
Mats and matting (except switchboard and conductive; reclaimed rubber and scrap rubber may be used for airplane walkways, pilot house, bridge deck and gun platforms)
Molded wheels and casters (except hospital and surgical equipment and airplane tailwheels)
Name plates
Office machine silencers
Paper padding adhesives
Paving blocks
Pedal rubbers
Picture screens
Plate wipers
Plywood adhesives
Rubber-covered lamp guards, handles, grab rails and knobs (except dielectric)
Rubber thread
Sateen gimp
Serving trays
Sewage disposal bags and paper
Shims (automotive)
Sink pads, mats, sprays and stoppers
Stair and step treads (except conductive)
Steering wheels
Step plates
Stove top pads
Table tops (except conductive)
Tank fenders and flaps
Telephone bases
Tent fabrics
Thermostat covers
Tile and tiling (except conductive)
Toilet seats
Tractor and implement tires
Typewriter keys
Valve stems for tire tubes other than airplane tire tubes
Wainscoting
Wheelbarrow and lawnmower tires
Window squeegees (but not windshield wipers)
Wrestling mat covers
Zipper tabs

SCHEDULE V

Index of products for which crude rubber, reclaimed rubber and scrap rubber may be consumed, and of products for which the consumption of these materials is prohibited. (See paragraph (c) (14) of Revised Supplementary Order No. M–15–b)

This Schedule constitutes an index of the permitted and prohibited products under Schedules I, II–A, II–B, II–C, III and IV attached to Revised Supplementary Order No. M–15–b, and is attached to such order for the convenience of the industry. Appropriate cross-references are made to such other schedules. Crude rubber, latex, reclaimed rubber and scrap rubber may not be consumed to manufacture any product or material not mentioned in this Schedule V unless otherwise authorized by the Director General for Operations.

Product	Schedule	Group	Remarks
Abrasive implements.	II-A	19	
	II-B	16	
Accelerator connections.	IV	A	
Accelerator pedals	III	.....	
Accessories, medical, etc.	II-A	44	
Acid hose	II-A	8	
Acoustic aids	II-A	43	
Adhesives, bookbinding.	III	.....	See bookbinding.
Adhesives, paper padding.	III	.....	See paper padding.
	IV	B	
Adhesives, plywood.	III	.....	See plywood.
	IV	B	See plywood.
Adhesives, seaming bags.	II-C	2	
Adhesives, surgical appliances.	II-C	1	
Agitators	II-A	9	
	II-B	13	
Air brake hose	II-A	29	
Air brake parts	II-A	29	
Air drill hose	II-A	8	
Airbags, tire	II-A	30	
	II-A	32	
Airplane bumpers	IV	B	See door checks.
Airplane channel	IV	A	See channel.
	IV	B	

Product	Schedule	Group	Remarks
Airplane de-icer parts.	II-A	20	
Airplane door checks	IV	B	See door checks.
Airplane equipment	II-A	62	
Airplane tailwheels	IV	B	See molded wheels.
Airplane tires	II-A	30	
Airplane tire valve stems.	IV	B	See valve stems.
Airplane grommets	IV	B	See grommets.
Airplane walkways	IV	B	See link mats; also mats.
Airplane weatherstrip.	IV	A	See weatherstrip.
Animal boots & shoes.	III	.....	
Appliances, surgical	II-C	1	
Applicators, sponge	III	.....	See sponge applicators.
Aprons, cigar machine.	III	.....	See cigar machine aprons.
Aprons, draper	III	.....	See draper aprons.
Aprons, paper machine.	III	.....	See paper machine aprons.
Aprons, X-ray	II-A	39	
Arbor pipe forming hose.	II-A	8	
Arch supports	III	.....	
Arctics	II-A	35	
Arm rests	III	.....	
Arm rests	IV	A	See sponge.
Artificial leather	III	.....	
	IV	B	
Artificial limbs	II-A	39	
	II-C	26	
Ash trays	IV	B	
Athletic equipment	II-C	3	
	IV	B	
Athletic shoes	III	.....	See cleats.
Audiometers	II-A	43	
Automotive accelerator pedals.	III	.....	See accelerator pedals.
Automotive axle bumpers.	IV	A	See bumpers.
Automotive parts	II-A	29	
	II-C	4	
	IV	B	See door checks.
Automotive radiator hose.	II-C	18	
Automotive shims	IV	B	See shims.
Axle, bumpers	IV	A	See bumpers.
Bags, adhesives	II-C	2	
Bags, blood pressure	II-A	46	
	II-B	2	
Bags, canvas	IV	B	See canvas.
Bags, flyers'	IV	A	See flyers'.
Bags, gas main	II-A	20	
Bags, hat-forming	III	.....	See hat-forming bags.
Bags, ice	II-A	42	
Bags, inhalation	II-A	46	
	II-B	2	
Bags, molding	II-A	63	
Bags, powder	III	.....	See powder bags.
Bags, prostatic	II-A	39	
	II-B	1	
Bags, sewage disposal.	IV	B	See sewage.
Ball cock washers	II-A	36	
Balloons, meteorological.	II-A	51	
	II-B	7	
Balls, fuller	II-A	36	
Balls, tank	II-A	36	
Band daters	II-A	26	
	II-A	27	
Bands, artificial limbs.	II-A	39	
Bands, orthodontia	II-A	39	
Bands, rubber	III	.....	See rubber bands
	IV	A	See rubber bands
Barrel lining	II-C	7	
Base, fan	III	.....	See fan bases.
	IV	B	See fan bases.
Base plugs, electric	III	.....	See electric base plugs.
Base stock	II-A	31	
	II-C	30	
Base, telephone	III	.....	See telephone bases.
	IV	B	See telephone bases.
Basin gaskets and washers.	III	.....	
Basin stoppers	III	.....	
Basketball shoes	IV	A	See gym shoes.
Baskets, insulation	II-B	13	
Baskets, rubber	II-A	9	
Bath sprays	III	.....	
	IV	B	
Bath trays, foot	III	.....	See foot bath trays.
Bath tub stoppers	III	.....	
Battery carrier straps	III	.....	
Battery containers	II-C	9	
Battery drain tubes	II-C	4	
Beakers	II-A	9	
Beer tubing	III	.....	
Bellows, camera	III	.....	See camera bellows.
Belt buckets, elevator.	III	.....	See elevator belt buckets.
Belt repair material	II-A	3	
Belt splicing material.	II-A	3	
Belting, conveyor	II-A	4	
Belting, elevator	II-A	4	
Belts, concentrator	III	.....	See concentrator belts.
Belts, flat transmission.	II-A	5	
	II-B	14	
Belts, hatters'	III	.....	See hatters' belts.
Belts, hog beater	II-A	5	
Belts, last puller	II-A	3	
Belts, polishing	II-A	3	
Belts, round	II-B	14	
Belts, sanitary	II-C	26	
Belts, street sweeper	III	.....	See street sweeper belts.
Belts, umbilical	II-C	26	
Belts, V	II-A	7	
	II-B	14	
	II-C	6	
Belts, vacuum cleaner.	II-A	61	
Bibb washers	II-A	36	
Bicycle tires	II-C	33	
Bladders basketball, etc.	II-C	3	
Blades, fan	III	.....	See fan bases.
	IV	B	See fan bases.
Blades, windshield wiper.	II-A	29	
Blankets, lineman's	II-A	20	
Blankets, newspaper	II-A	28	
Blankets, offset	II-A	28	
Blocks, cutting	III	.....	See cutting blocks.
Blocks, paving	IV	B	See paving blocks.
Blood pressure bags	II-A	46	
	II-B	2	
Blowers, lining	II-A	9	
Blow-out preventors, oil well.	II-A	18	
Blow-out shoes	III	.....	
Bookbinding adhesives.	III	.....	
Boots, air-brake	II-A	29	
Boots, animal	III	.....	See animal boots.
Boots, brake	II-C	4	
Bottle caps	III	.....	See feeding bottle.
Bottle carriers	III	.....	
Bottle driers	III	.....	
Bottles	II-A	9	
Bottles, ink	III	.....	See ink wells.
	IV	B	See ink wells.
Bottles, thermos	III	.....	See thermos bottle.
Bottles, water	II-A	41	
Box die gum	II-A	25	
Box dies	II-A	26	
	II-A	27	
Box toes (shoes)	II-C	17	
Boxes, cartridge clip.	IV	B	See cartridge.
Braided tubing	II-C	18	
Brain surgery caps	II-A	39	
Brake block	II-C	5	
Brake boots	II-C	4	
Brake lining	II-A	6	
	II-C	5	
Brake rod rattlers	III	.....	
Breast pumps	II-A	41	
Brewery hose	III	.....	
Brush bristles	III	.....	
Brush setting compounds.	II-C	8	
	IV	A	
Buckets	II-A	9	
	II-B	13	
Bulbs, medical, etc	II-A	41	
Bulbs, photographers'.	III	.....	See photographers' bulbs.
Bumper stripping	IV	A	
Bumper tacks	III	.....	
	IV	B	
Bumpers, axle	IV	A	
Bumpers, door	IV	B	See door checks.
Bumpers, hood	IV	B	See hood.
Bumpers, lug straps	III	.....	See lug straps.
Bumpers, screw	III	.....	
Bumpers, spring	II-C	4	
Bumpers, toilet seat	III	.....	See toilet bumpers.
	IV	A	See toilet bumpers.
Bumpers, vacuum cleaner.	III	.....	See vacuum cleaner tires.
Bunion pads	III	.....	
Bus tires	II-A	30	
Bushings, coffee maker.	III	.....	See coffee maker.
Bushings, automotive.	II-A	29	
Business machine parts.	II-C	19	
Buttons	IV	B	
Cable bandages, lineman's.	II-A	20	
Cable connectors	II-A	15	
Cable covering	II-C	18	
Cable end test caps	II-A	20	
Cable insulating compounds.	II-A	1	
Cable splicing compound.	II-A	2	
Camelback	II-A	31	
Camera bellows	III	.....	
Camera cushioning	IV	A	See sponge.
Camera focusing cloth.	III	.....	
Candy molds	III	.....	
Canopies, oxygen tent.	III	.....	See oxygen tent.
Canvas water bags	IV	B	
Cap covers	IV	B	
Capping stock	II-A	31	
	II-C	30	
Caps, spark plug	III	.....	See spark plug.
Caps, surgery	II-A	39	
Caps, faucet	III	.....	See faucet caps.
	IV	B	See faucet caps.
Caps, line tube	III	.....	See line tube caps.
Caps, vaccine	II-A	39	
Carboy pads	III	.....	
Car heater hose	II-C	18	
Card clothing	II-A	20	
Carriers, bottle	III	.....	See bottle carriers.
Cartridge clip boxes	IV	B	
Case, thermometer	III	.....	See thermometer cases.
Casings, bicycle tire	II-C	33	
Casket gaskets	III	.....	
Caster, molded	III	.....	See molded wheels.
	IV	B	See molded wheels.
Casting, molds	III	.....	See molds for casting.
Catheters	II-A	39	
	II-B	1	
Cellular discs	IV	A	
Cements, repair	II-A	52	
	II-C	28	
Cements, shoe	II-A	57	
	II-B	12	
Chair pads	III	.....	See desk.
	IV	B	See desk.
Chair parts	III	.....	
Channel filler	III	.....	
	IV	B	
Channel rubber	IV	A	
Checks, door	IV	B	See door checks.
Chemical hose	II-A	8	
Chevrons	IV	B	
Christmas-tree devices.	III	.....	
Chute lining	III	.....	
Cigar machine aprons.	III	.....	
Cleats, athletic shoes.	III	.....	
Cleats, elevator	III	.....	See elevator belt.
Clip boxes, cartridge	IV	B	See cartridge.
Clips, coated	III	.....	See coated clips.
Cloth, filter	III	.....	See filter cloth.
Clothing, athletic	IV	B	See athletic equipment.
Clothing bags	IV	A	See flyers'.
Clothing, sand blast	II-A	55	
Clutch facings	II-A	6	
	II-C	5	
Coated clips	III	.....	
Coatings, thermoplastic.	III	.....	See thermoplastic coatings.
Coffee maker bushings.	III	.....	
Colostomy outfits	II-A	39	
	II-B	1	
Combined fabrics	IV	A	
Component parts	II-A	21	
Compound, cable splicing.	II-A	2	

Product	Schedule	Group	Remarks
Compounds, brush setting.	II-C	8	
	IV	A	See brush setting compounds.
Compounds, fabric proofing.	II-C	32	
Compounds, laboratory.	II-A	60	
	II-B	17	
	II-C	31	
Compounds, insulating.	II-A	1	
Compounds, sealing	II-A	50	
	II-B	11	
	II-C	2	
Compounds, seaming clothing.	II-A	54	
Concentrator belts	III	.....	
Concrete fillers	III	.....	See contraction joints.
Concrete hose	II-A	8	
Conductive flooring	III	.....	See flooring.
	IV	B	See flooring.
Conductive mats	III	.....	See mats.
	IV	B	See mats.
Conductive soles, taps, heels.	II-A	56	
Conductive table tops.	IV	B	See table tops.
Conductive tile	IV	B	See tile.
Conductive treads	IV	B	See stair treads.
Connections, accelerator.	IV	A	See accelerator.
Connections, medical, etc.	II-A	44	
Containers, battery	II-C	9	
Contraction joint seals.	III	.....	
Controls, hydraulic	II-A	29	
Conveyor belting	II-A	4	
Cooling hose, X-ray	II-A	39	
Cord dip, tire	II-B	18	
Cord friction	II-A	33	
	II-C	29	
Corn pads	III	.....	
Corrective appliances.	II-C	1	
Coupling rings, pipe	II-A	22	
Couplings, flexible	II-A	8	
Couplings, milk equipment.	II-A	24	
Covered rolls	II-A	11	
Covers, cap	IV	B	See cap covers.
Covers, dust and lever housing.	IV	A	See dust.
Covers, feeding	III	.....	See feeding bottle caps.
Covers, thermostat	IV	B	See thermostat covers.
Covers, truss pads	II-A	42	
Covers, typewriter	III	.....	See typewriter.
Covers, wrestling mat.	IV	B	See wrestling.
Cowl vent hose	IV	A	
Cowl vent seals & gaskets.	IV	A	
Crash helmet cushions.	IV	B	See cellular pads.
Crib sheeting	III	.....	
Crutch pads	III	.....	
Crutch tips	II-C	11	
Cuffing	III	.....	See gauntlets.
Cups, force	II-C	27	
Curb line hose	II-C	18	
Cushion stock	II-A	31	
	II-A	33	
	II-C	29	
	II-C	30	
Cushioning, camera	IV	A	See sponge.
Cushioning, sponge	IV	A	See sponge.
Cushions, artificial limbs.	II-A	39	
Cushions, ear	IV	A	See sponge.
Cushions, metatarsal.	II-A	42	
Cushions, operating	II-A	46	
Cushions, upholstery.	III	.....	
Cutting blocks	III	.....	
Cutting rubbers	II-A	28	
Dam, dental	II-A	46	
	II-B	5	
Dam gates	II-A	20	
Dampers, vibration	II-A	29	
	II-A	65	
Daters, band	II-A	26	
	II-A	27	
Deck covering	IV	B	See mastic.
Defroster parts & hose.	III	.....	
De-icer parts, airplane.	II-A	20	
Dental bulbs	II-A	41	
Dental dam	II-A	46	
	II-B	5	
Dental instrument parts.	II-A	39	
Dental mouth props	II-A	46	
Dental separating strips.	II-A	46	
Dental supplies	II-A	39	
Dental tubes and tubing.	II-A	39	
	II-B	1	
Denture rubber	II-A	46	
Denture suctions	II-A	39	
Desk pads	III	.....	
	IV	B	
Desk sets	IV	B	
Development tanks	III	.....	See hard rubber trays.
Diaphragms, regulating.	II-A	36	
Dielectric grommets	III	.....	See grommets.
	IV	B	See grommets.
Dielectric handle grips.	III	.....	See handle.
	IV	A	
Dielectric lamp guards.	IV	B	See rubber covered.
Dies, box	II-A	26	
	II-A	27	
Dilators	II-A	39	
Dippers	II-A	9	
	II-B	13	
Discs, cellular	IV	A	See cellular discs.
Dish drainers	III	.....	
	IV	B	
Dispensers, glue	III	.....	See glue dispensers.
Divers' hose	II-A	8	
Diving equipment	II-A	53	
Door checks	IV	B	
Door knob covers	IV	B	
Drain hose	III	.....	See washing machine.
Drain pipe lining	III	.....	
Drain stoppers	III	.....	See sink sprays.
Draper aprons	III	.....	
Dredging sleeves	II-A	8	
Driers, bottle	III	.....	See bottle driers.
Drill pipe protectors	II-A	18	
Droppers, medicine	II-A	41	
Drums, insulation	II-B	13	
Drums, lined	II-A	10	
Dust housing covers	IV	A	
Ear cushions	IV	A	See sponge.
Earthmover tires	II-A	30	
Edging, elastic	II-C	26	
Elastic fabrics	II-C	26	
Elbows, flush	II-C	27	
Electric appliance parts.	II-C	20	
Electric base plugs	III	.....	
Elevator belting	II-A	4	
Elevator buckets and cleats.	III	.....	
Engine mountings	II-A	29	
Engravers' rubber	II-A	26	
Envelopes	IV	A	See pliofilm.
Equipment, airplane	II-A	62	
Equipment, hospital.	IV	B	See molded wheels.
Erasers	II-C	12	
	IV	A	
Escalator handrails	IV	A	
Exercise machine parts.	III	.....	
Exhausters, lining	II-A	9	
Expansion joint hose.	II-A	8	
Extension lamp handles.	III	.....	
Eye buffer	IV	A	See recoil pads.
Fabric, tire repair	II-A	33	
	II-C	29	
Fabrics, combined	IV	A	See combined fabrics.
Fabrics, elastic	II-C	26	
Fabrics, proofing compounds.	II-C	32	
Fabrics, tent	IV	B	See tent.
Face pieces, inhalation.	II-A	46	
	II-B	2	
Fan bases & blades	III	.....	
	IV	B	
Fans, insulation	II-A	9	
	II-B	13	
Faucet caps	III	.....	
	IV	B	
Faucet filters	III	.....	
Feeding bottle caps	III	.....	
Feeding nipples	II-A	48	
	II-B	8	
Fender protective plates.	IV	B	
Fender welting	IV	B	
Fenders, tank	IV	B	See tank fenders.
Ferrules	III	.....	
Fibre pads	II-C	1	
Fibre, rubberized	III	.....	See rubberized hair.
	IV	A	See rubberized hair.
Filler, channel	III	.....	See channel filler.
	IV	B	See channel filler.
Filler, concrete	III	.....	See contraction joint.
Filler strip	II-A	31	
	II-C	30	
Filter cloth	III	.....	
Filters, faucet	III	.....	See faucet filters.
Finger cots, industrial.	II-A	37	
	II-B	6	
Finger cots, medical, etc.	II-A	39	
	II-B	1	
Finger pads	III	.....	
Finger print rolls	II-A	28	
Finger print rubber	II-A	28	
Finishes, leather	III	.....	See leather finishes.
	IV	B	See leather finishes.
Fire control cushioning.	IV	A	See sponge.
Fire extinguisher tubing.	II-C	18	
Fire hose	II-A	23	
Fittings, hard rubber.	II-A	9	
Fittings, insulation	II-B	13	
Fittings, lined	II-A	10	
Flanged flexible hose	II-A	8	
Flaps, bicycle tire	II-C	33	
Flaps, tank	IV	B	See tank fenders.
Flaps, tire	II-A	30	
Flat transmission belts.	II-A	5	
	II-B	14	
Flexible couplings	II-A	8	
Flight control cushioning.	IV	A	See sponge.
Float valve shank washers.	II-C	27	
Floats, tank	III	.....	See tank floats.
Flooring	III	.....	
	IV	B	
Flush elbows	II-C	27	
Flush valve washers	II-C	27	
Fly paper	III	.....	
	IV	A	
Fly swatters	IV	B	
Flyers' clothing bags	IV	A	
Focusing cloth, camera.	III	.....	See camera focusing.
Foot boards (motorcycle).	IV	A	
Footbath trays	III	.....	
	IV	B	
Footpads, medicated.	II-A	40	
Footwear	II-A	34	
	II-A	35	
Force cups	II-C	27	
Fountain pen stock	III	.....	
Fountain syringe tubing.	II-A	45	
Frames	II-A	9	
	II-B	13	
Freezing trays, refrigerator.	III	.....	See refrigerator.
Friction, cord and fabric.	II-A	33	
	II-C	29	
Friction tape	II-C	13	
	IV	A	
Full circle airbags	II-A	32	
Fuller balls	II-A	36	
Fume duct, insulation.	II-A	9	
	II-B	13	
Funnels	II-A	9	
	II-B	13	
Furniture parts	III	.....	See chair.
Gaiters	II-A	35	
Garage air hose	II-C	18	
Gas main bags	II-A	20	
Gas masks	II-A	16	
	II-C	26	
Gaskets	II-C	27	
	III		
Gaskets, basin	III	.....	See basin gaskets.
Gaskets, casket	III	.....	See casket gaskets.
Gaskets, coffee maker.	III	.....	See coffee makers.
Gaskets, cowl	IV	A	See cowl vent.
Gaskets, hose	II-A	20	
Gaskets, lavatory	III	.....	See sink gaskets.

Product	Schedule	Group	Remarks
Gaskets, milk equipment.	II-A	24	
Gaskets, sealed beam.	II-A	29	
Gaskets, sealing	II-C	2	
Gaskets, sink	III	.....	See sink gaskets.
Gaskets, toilet	III	.....	See toilet closet.
	IV	A	See toilet closet.
Gaskets, windshield wiper.	II-A	29	
Gasoline hose	II-A	8	
Gasoline pump hose	III	.....	
Gasoline tubing	III	.....	
Gauntlets	III	.....	
Gear shift knobs	IV	B	
Gear silencers	III	.....	
Gimp, sateen	IV	B	See sateen gimp.
Glazing rubber	IV	B	See channel filler.
Gloves, autopsy	II-A	37	
	II-B	6	
Gloves, electricians'	II-A	38	
	II-B	4	
Gloves, household	III	.....	See household gloves.
Gloves, industrial	II-A	37	
	II-B	3	
	II-B	6	
Gloves, mortuary	II-A	37	
	II-B	6	
Gloves, net-lined	II-A	37	
Gloves, surgeons'	II-A	50	
	II-B	10	
Gloves, X-ray	II-A	39	
Glue dispensers	III	.....	
Goggles	II-A	16	
	II-C	26	
Grab rails	IV	B	See rubber covered lamp.
Graining tools, painters'.	III	.....	See painters'.
Graphite guns	III	.....	
Grease gun hose	II-A	8	
Grease tubing	II-C	18	
Grips, gun	IV	B	See gun.
Grips, handle	III	.....	See handle.
	IV	A	See handle.
Grips, knife	III	.....	See knife handles.
Grommets	III	.....	
	IV	B	
Guard, wire	III	.....	See trolley wire guards.
Guards, paint brush	III	.....	See paint brush guards.
Gum, box die	II-A	25	
Gum, rubber die	II-A	25	
Gum, rubber type	II-A	25	
Gum, stamp	II-C	23	
Gum, tube repair	II-A	33	
	II-C	29	
Gun grips	IV	B	
Gun platforms	IV	B	See link mats, also mats & matting.
Guns, graphite	III	.....	See graphite guns.
Gunsight slot pads	IV	A	See sponge.
Gym shoes	IV	A	
Hair, rubberized	III	.....	See rubberized.
	IV	A	See rubberized.
Handballs	II-C	3	
Handle grips	III	.....	
	IV	A	
Handles, extension lamp.	III	.....	See extension lamp.
Handles, knife	III	.....	See knife handles.
Handles, rubber covered.	IV	B	See rubber covered.
Hand rests	IV	A	See sponge.
Handrails, escalators	IV	A	See escalator.
Hard rubber, dielectric.	II-A	15	
Hard rubber, industrial	II-A	9	
Hard rubber, medical, etc.	II-A	44	
Hard rubber photographic trays.	III	.....	
Hard rubber spatulas.	III	.....	
Harness strapping, loom.	III	.....	See loom harness.
Hat-forming bags	III	.....	
Hatters' belts	III	.....	
Headharness	II-A	16	
Heads, mallet	II-C	34	
	IV	A	See mallet.
Hearing instruments	II-A	43	
Heel bases	II-C	14	
Heels	II-C	14	
Heels, conductive	II-A	66	
Helmet cushions, crash.	IV	B	See cellular pads.
Helmets, sand blast	II-A	55	
Hog beater belts	II-A	5	
Holders, test tube	III	.....	See test tube.
Holdups, lug straps	III	.....	See lug straps.
Hood supports	IV	B	
Horse shoes	III	.....	
Horseshoe pads	II-C	21	
Horticultural tape	III	.....	
Hose, acid	II-A	8	
Hose, air brake	II-A	29	
Hose, air drill	II-A	8	
Hose, arbor pipe forming.	II-A	8	
Hose, automotive radiator.	II-C	18	
Hose, blower	II-A	8	
Hose, brewery	III	.....	See brewery.
Hose, car heater	II-C	18	
Hose, cement	II-A	8	
Hose, chemical	II-A	8	
Hose, cowl vent	IV	A	See cowl vent.
Hose, curb pump	II-A	8	
Hose, curb line	II-C	18	
Hose, defroster	III	.....	See defroster parts.
Hose, divers'	II-A	8	
Hose, dry material	II-A	8	
Hose, dust collector	II-A	8	
Hose, exhaust	II-A	8	
Hose, expansion joint.	II-A	8	
Hose, fire	II-A	23	
Hose, flanged	II-A	8	
Hose, garage air	II-C	18	
Hose, gaskets	II-A	20	
Hose, gasoline	II-A	8	
Hose, gasoline pump	III	.....	See gasoline.
Hose, grease	II-C	18	
Hose, grease gun	II-A	8	
Hose, hydraulic brake.	II-A	29	
Hose, hydraulic control.	II-A	8	
Hose, jetting	II-A	8	
Hose, lawn	IV	A	See water hose.
Hose, lineman's	II-A	20	
Hose masks	II-A	16	
	II-C	26	
Hose, milk conveying.	II-A	8	
Hose, mill	II-A	23	
Hose, nozzles	III	.....	
Hose, oil	II-A	8	
Hose, paint	II-A	8	
Hose, phosphate	II-A	8	
Hose, pinch valve	II-A	8	
Hose, pneumatic	II-A	8	
Hose, railroad	II-A	8	
Hose, rock wool insulation.	II-C	18	
Hose, rotary drillers'	II-A	8	
Hose, sand blast	II-A	8	
Hose, sanitary	II-A	8	
Hose, service station	III	.....	See service station.
Hose, spray	II-A	8	
	II-C	18	
Hose, steam	II-A	8	
Hose, stirrup pump	III	.....	See stirrup pump.
Hose, suction	II-A	8	
Hose, swimming pool	III	.....	See swimming pool.
Hose, tank wagon	II-A	8	
Hose, vacuum	II-A	8	
Hose, vacuum brake	II-A	29	
Hose, vacuum cleaner.	II-C	18	
Hose, washers	II-A	20	
Hose, washing machine.	III	.....	See washing machine.
Hose, water	II-C	18	
	IV	A	See water hose.
Hose, welding	II-A	8	
Hose, whiskey	III	.....	See whiskey.
Hose, X-ray	II-A	39	
Hospital sheeting	II-A	47	
	IV	B	
Hospital equipment wheels and casters.	IV	B	See molded wheels.
Household gloves	III	.....	
Hydraulic brake hose.	II-A	29	
Hydraulic brake parts.	II-A	29	
Hydraulic clutch controls.	II-A	29	
Hydraulic control hose.	II-A	8	
Hydraulic throttle control.	II-A	29	
Hydrometer parts	III	.....	
Ice bags	II-A	42	
Ice cube trays	III	.....	
Implement tires	IV	B	See tractor.
Implements, abrasive.	II-A	19	
	II-B	16	
Inflations, milking machine.	II-A	24	
Inhalation bags	II-A	46	
	II-B	2	
Inhalation facepieces	II-A	46	
	II-B	2	
Inhalators	II-A	16	
	II-C	26	
Injections (biological) specimen.	III	.....	See specimen.
Inkwells	III	.....	
	IV	B	
Insoles (shoe)	II-C	17	
Instep supports	III	.....	
Instruments, cushioning.	IV	A	See sponge.
Instruments, musical.	III	.....	See musical.
Insulator hoods	II-A	20	
Insulators, post	III	.....	See post insulators.
Invalid rings	II-A	46	
Jetting hose	II-A	8	
Joint seals	III	.....	See contraction joint.
Joint washers, slip	III	.....	See slip joint.
Keys, typewriter	III	.....	See typewriter keys.
	IV	B	See typewriter keys.
Kneeling pads	III	.....	
	IV	B	
Knife handles	III	.....	
Knobs, gear shift	IV	B	See gear shift knobs.
Knobs, rubber covered.	IV	B	See rubber covered.
Labels	III	.....	
	IV	A	
Laboratory bulbs	II-A	41	
Laboratory compounds.	II-A	60	
	II-B	17	
	II-C	31	
Laboratory tubes and tubing.	II-A	39	
	II-B	1	
Lagging, pulley	III	.....	See pulley lagging.
Lamp guards	IV	B	See rubber covered.
Lamp handles	III	.....	See extension lamp.
Lamp shades	III	.....	
Last puller belts	II-A	3	
Lavatory gaskets	III	.....	See sink gaskets.
Lawn hose	IV	A	See water hose.
Lawnmower tires	III	.....	
	IV	B	See wheelbarrow.
Leather, artificial	III	.....	See artificial leather.
	IV	B	See artificial leather.
Leather finishes	III	.....	
	IV	B	
Lever, housing	IV	A	See dust.
Life saving suits	II-A	58	
Light sockets	III	.....	See electric base.
Line hose	II-A	20	
Line tube caps	III	.....	
Lineman's equipment.	II-A	20	
Liners, oil well	II-A	18	
Lining, brake	II-A	6	
	II-C	5	
Lining, barrel	II-C	7	
Lining, blowers, exhausters and pumps.	II-A	9	
Lining bumper rubbers, oil well.	II-A	18	
Lining, chute	III	.....	See chute lining.
Lining, drain pipe	III	.....	See drain pipe.
Lining, industrial brake.	II-A	6	
Link mats	III	.....	
	IV	B	
Lock gates, seals	II-A	20	
Loom harness	III	.....	
Loom pickers	II-A	13	
Low platform tires	II-A	30	
Lug stock	II-A	31	
	II-C	30	
Lug straps	III	.....	
Machine gun pads	IV	A	See recoil pads.

Product	Schedule	Group	Remarks
Machine parts, exercise.	III	.....	See exercise machine.
Mack gaskets	III	.....	See sink gaskets.
Magneto parts	II-A	15	
Mallet heads	IV	A	
Mallets	II-C	34	
Marbon B	III	.....	
	IV	A	
Marking devices	II-A	25	
Mask parts	IV	A	See sponge.
Masks, gas	II-A	16	
	II-C	26	
Masks, hose	II-A	16	
	II-C	26	
Mastic deck covering.	IV	B	
Mat covers, wrestling.	IV	B	See wrestlings.
Mats and matting	III	.....	
	IV	B	
Mats, link	III	.....	See link mats.
	IV	B	See link mats.
Mattresses	III	.....	See cushions.
Measures	II-A	9	
	II-B	13	
Mechanical packings	II-A	17	
Medical bulbs	II-A	41	
Medical instrument parts.	II-A	39	
Medical tubes and tubing.	II-A	39	
	II-B	1	
Medicine droppers	II-A	41	
Metatarsal cushions	II-A	42	
Metatarsal pads	II-A	42	
Meterological balloons.	II-A	51	
	II-B	7	
Midsoles (shoes)	II-C	17	
Milk conveying hose	II-A	8	
Milk equipment	II-A	24	
Mill hose	II-A	23	
Mine battery parts	II-A	16	
Mine lamp parts	II-A	16	
Mine pacs	II-A	34	
Mine ventilating tubing.	II-A	20	
	II-B	15	
Mining headharness	II-A	16	
Mixtures(laboratory testing).	II-A	60	
	II-B	17	
	II-C	31	
	II-A	63	
Molding bags	III	.....	See candy molds.
Molds, candy	III	.....	
Molds, casting	III	.....	
Mortuary bulbs	II-A	41	
Mortuary instrument parts.	II-A	39	
Mortuary tubes and tubing.	II-A	39	
	II-B	1	
Motorcycle tires	II-A	30	
Motorcycle foot boards.	IV	A	See footboards.
Mountings, automotive.	II-A	29	
Mud pump parts, oil well.	II-A	18	
Musical instruments.	III	.....	
Name plates	IV	B	
Newspaper blankets	II-A	28	
Nipples, feeding	II-A	48	
	II-B	8	
Nozzles, hose	III	.....	See hose nozzles.
Office machine silencers.	IV	B	
Office machinery silencers.	III	.....	See typewriter.
Offset blankets	II-A	28	
Oil hose	II-A	8	
Oil well parts	II-A	18	
Operating cushions	II-A	46	
Orthodontia bands	II-A	39	
Out soles (shoes)	II-C	15	
Out soling strips (shoes).	II-C	15	
Outlet gaskets, closet.	III	.....	See toilet outlet gaskets.
Oxygen tent canopies.	III	.....	
Oxygen tents	II-A	46	
	II-B	2	
Pacifiers	III	.....	
Packers, oil well	II-A	18	
Packing, mechanical	II-A	17	
Packing, sheet	II-A	17	
Packing, strip	II-A	17	
Pads	III	.....	See gaskets, pads, etc.
Pads, bunion	III	.....	See bunion pads.
Pads, carboy	III	.....	See carboy pads.
Pads, chair	III	.....	See desk.
	IV	B	See desk.
Pads, corn	III	.....	See corn pads.
Pads, crash helmet	IV	B	See cellular.
Pads, crutch	III	.....	See crutch pads
Pads, desk	III	.....	See desk.
	IV	B	See desk.
Pads, finger	III	.....	See finger pads.
Pads, horseshoe	II-C	21	
Pads, kneeling	III	.....	See kneeling pads.
	IV	B	See kneeling pads.
Pads, metatarsal	II-A	42	
Pads, press die	II-A	12	
Pads, recoil	III	.....	See recoil pads.
	IV	A	See recoil pads.
Pads, sink	IV	B	See sink.
Pads, stove top	IV	B	See stove top pads.
Pads, surgical	II-C	1	
Pads, truss	II-A	42	
	II-C	25	
Pails	II-A	9	
Paint brush guards	III	.....	
Paint spray hose	II-A	8	
Painters' graining tools.	III	.....	
Panelboard	III	.....	
Paper, fly	III	.....	See fly paper.
	IV	A	See fly paper.
Paper machine aprons.	III	.....	
Paper making equipment.	II-A	3	
Paper padding adhesives.	III	.....	
	IV	B	
Paper, sewage disposal.	IV	B	See sewage.
Parachute backs and seats.	IV	A	See sponge.
Passenger car tires	II-A	30	
Pasteurizer couplings.	II-A	24	
Patches, repair	II-A	33	
	II-C	29	
Paving blocks	IV	B	
Pedal rubbers	III	.....	
	IV	B	
Pedals, accelerator	III	.....	See accelerator.
Pen stock, fountain	III	.....	See fountain pen.
Pencil plugs	II-C	12	
Pessaries	II-A	49	
	II-B	9	
Phosphate hose	II-A	8	
Photo wringers	III	.....	
Photographers' bulbs & tubes.	III	.....	
Photographic trays	III	.....	See hard rubber.
Pickers, loom	II-A	13	
Picture screens	IV	B	
Pinch valve hose	II-A	8	
Pipe coupling rings	II-A	22	
Pipe, hard rubber	II-A	9	
	II-A	44	
Pipe, insulation	II-A	9	
	II-B	13	
Pipe, lined	II-A	10	
Pipe lining, drain	III	.....	See drain pipe.
Pitman arm bushings.	II-A	29	
Plasters, label	III	.....	See labels.
Plasters, medicated	II-A	40	
Plate wipers	IV	B	
Platens, typewriter	III	.....	See typewriter.
Plates, fender	IV	B	See fender.
Plates, name	IV	B	See name plates.
Plates, printing	II-A	27	
Plates, step	IV	B	See step.
Pliofilm	III	.....	
	IV	A	
Plioform	III	.....	
	IV	A	
Pliolite	III	.....	
	IV	A	
Plug connectors	III	.....	See electric base plugs.
Plywood adhesives	III	.....	
	IV	B	
Pneumatic hose	II-A	8	
Pneumatic truss pads.	II-A	42	
Policemen, rubber	II-A	39	
Polishing belts	II-A	3	
Post insulators	III	.....	
Powder bags (mining).	III	.....	
Press die pads	II-A	12	
Pressure sensitive tape.	II-C	22	
Printers' equipment	II-A	28	
Printers' rollers	II-A	28	
Printing plates	II-A	27	
Propeller bearing mountings.	II-A	29	
Prophylactics	II-A	49	
	II-B	9	
Prostatic bags	II-A	39	
	II-B	1	
Prosthetic devices	II-B	1	
Protective clothing seaming.	II-A	54	
Protective plates	IV	B	See fender.
Protectors, telephone.	III	.....	See telephone protectors.
Protectors, telephone cord.	III	.....	See telephone cord.
Pulley lagging	III	.....	
Pump hose, gasoline	III	.....	See gasoline curb.
Pump pistons, oil well.	II-A	18	
Pumps, breast	II-A	41	
Pumps, insulation	II-B	13	
Pumps, lining	II-A	9	
Pumps, rubber	II-A	9	
Pumps, tubing	II-C	18	
Racks	II-A	9	
	II-B	13	
Railroad hose	II-A	8	
Rattlers, brake rod	III	.....	See brake rod.
Recapping materials	II-A	31	
	II-C	30	
Recoil pads	III	.....	
	IV	A	
Refrigerator parts	II-C	20	
Refrigerator trays	III	.....	
Reliners, tires	III	.....	See tire reliners.
Repair, deck covering.	IV	B	See mastic deck.
Repair materials, tire and tube.	II-A	33	
	II-C	29	
	III	.....	See tire & tube.
Respirators	II-A	16	
	II-C	26	
Rests, arm	III	.....	See arm rests.
Retreading materials.	II-A	31	
	II-C	30	
Rings, invalid	II-A	46	
Rings, pipe coupling.	II-A	22	
Rings, sealing containers.	II-A	59	
Rings, street car wheel.	II-A	64	
Road builder tires	II-A	30	
Road grader tires	II-A	30	
Rock service tires	II-A	30	
Rock wool insulation hose.	II-C	18	
	III	.....	
Rods, stirring	III	.....	See stirring rods.
Roll coverings	II-A	11	
Rollers, insulation	II-B	13	
Rollers, printers'	II-A	28	
Rolls, finger print	II-A	28	
Rotary drillers' hose	II-A	8	
Rubber bands	III	.....	
	IV	A	
Rubber, denture	II-A	46	
Rubber die gum	II-A	25	
Rubber, engravers'	II-A	26	
Rubber, finger print	II-A	28	
Rubber footwear	II-A	34	
	II-A	35	
Rubber, glazing	IV	B	See channel filler.
Rubber policemen	II-A	39	
Rubber solution for wet plate negatives.	II-A	28	
Rubber stamps	II-A	26	
	II-A	27	
Rubber thread	III	.....	
	IV	B	
Rubber type gum	II-A	25	
Rubberized hair and fibre.	III	.....	
	IV	A	
Rubbers, cutting	II-A	28	
Rubbers, footwear	II-A	35	
Rubbers, milk bottle filler.	II-A	24	
Sand blast clothing	II-A	55	
Sand blast hose	II-A	8	
Sand blast stencils	III	.....	
Sanitary belts	II-C	26	
Sanitary hose	II-A	8	
Sateen gimp	IV	B	
Screen diaphragms	II-A	3	
Screens, insulation	II-A	9	
	II-B	13	
Screens, picture	IV	B	See picture.
Screw bumpers	III	.....	
Sealed beam gaskets	II-A	29	
Sealing compounds	II-A	59	
	II-B	11	
	II-C	2	

Product	Schedule	Group	Remarks
Seals, contraction joint.	III		See contraction joint.
Seals, cowl vent	IV	A	See cowl vent seals.
Seat bottoms and backs.	IV	A	See sponge.
Seats, toilet	IV	B	See toilet seats.
Sectional airbags	II-A	32	
Self-adhering signs	III		
Separators, lineman's.	II-A	20	
Service station signal hose.	III		
Serving trays	IV	B	
Sets, desk	IV	B	See desk sets.
Sewage disposal bags	IV	B	
Shades, lamp	III		See lamp shades.
Shaft covering	II-C	18	
Shapes, automotive wiring.	II-C	4	
Sheet packings	II-C	17	
Sheeting, crib	III		See crib sheeting.
Sheeting, hospital	II-A	47	
	IV	B	See hospital sheeting.
Sheets, X-ray	II-A	39	
Shims	III		See gaskets, pads, etc.
Shims, automotive	IV	B	
Shock absorber bushings.	II-A	29	
Shock absorbers, V-belts.	III		See V-belt.
Shoe bottom fillers	II-C	16	
Shoe cements	II-A	57	
	II-B	12	
	II-C	16	
Shoe tapes			
Shoes, animal	III		See animal boots.
Shoes, blowout	III		See blowout shoes.
Shoes, elastic fabrics	II-C	26	
Shoes, gym	IV	A	See gym.
Signal hose, service station.	III		See service station.
Signs, self-adhering	III		See self-adhering signs.
Silencers, gear	III		See gear silencers.
Silencers, office machine.	IV	B	See office machine.
Silencers, typewriter	III		See typewriter.
Sink gaskets	III		
Sink pads, mats, sprays & stoppers.	IV	B	
Sink sprays and drain stoppers.	III		
Siphon washers	II-C	27	
Sleeves, dredging	II-A	8	
Sleeves, lineman's	II-A	20	
Sleeves, veterinary	II-B	2	
Slip joint washers	III		
Slush pump, oil well	II-A	18	
Soap dishes	IV	B	See bath sprays.
Soles, shoes	II-C	15	
Soles, conductive	II-A	56	
Soles, stick-on	III		See stick-on soles.
Soling strips, shoes	II-C	15	
Spark plug caps	III		
Spatulas	III		See hard rubber.
Special purpose tires	II-A	30	
Specimen (biological) injections.	III		
Splicing compound, cable.	II-A	2	
Sponge applicators	III		
Sponge cushioning	IV	A	
Sponge cushions	II-A	46	
Sponge rings, invalid	II-A	46	
Sponge, stamp gum cushion.	II-C	24	
Sponges	IV	B	See bath sprays.
Sports shoes	III		See cleats.
Spray hose	II-A	8	
	II-C	18	
Sprays, bath	III		See bath sprays.
	IV	B	See bath sprays.
Sprays, sink	III		See sink sprays.
	IV	B	See sink sprays.
Spring bumpers	II-C	4	
Springs, street car	III		See street car.
Spud washers	II-C	27	
Squash balls	II-C	3	
Squeegees, window	IV	B	See window.
Stabilizers, oil well	II-A	18	
Stair treads	III		
	IV	B	
Stamp gum	II-C	23	
Stamp sponge	II-C	24	
Stamps, rubber	II-A	27	
Stamps, toy	II-A	26	
	II-A	27	
Steam hose	II-A	8	
Steel wool pads	II-C	1	
Steering box pads	II-A	29	
Steering post bushings.	II-A	29	
Steering wheels	IV	B	
Stems, valve	IV	B	See valve stems.
Stencils, sand blast	III		See sand blasting.
Step plates	IV	B	
Stick-on soles and taps.	III		
Stipplers	III		
Stirring rods	III		
Stirrup pump hose	III		
Stock, fountain pen	III		See fountain pen stock.
Stools, lineman's	II-A	20	
Stoppers, basin	III		See basin stoppers.
Stoppers, bath tub	III		See bath tub.
Stoppers, drain	III		See sink sprays.
Stoppers, sink	IV	B	See sink.
Stopples, medical, etc.	II-A	39	
Storage battery parts	II-A	14	
	II-C	10	
Stove top pads	IV	B	
Strapping, loom harness.	III		See loom harness.
Straps, battery carrier.	III		See battery carrier.
Straps, lug	III		See lug straps.
Straps, toggle	III		See toggle straps.
Streetcar springs	III		
Streetcar wheel rings.	II-A	64	
Street sweeper belts	III		
Strip packings	II-A	17	
Strippers, oil well	II-A	18	
Stripping, bumper	IV	A	See bumper.
Stripping stock	II-A	31	
	II-C	30	
Stuffing box, oil well	II-A	18	
Suction cups, printers'.	II-A	28	
Suction hose	II-A	8	
Suctions, denture	II-A	39	
Suits, life-saving	II-A	58	
Supports, arch	III		See arch supports.
Supports, hood	IV	B	See hood.
Supports, instep	III		See instep supports.
Supports, surgical	II-C	26	
Surgeons' gloves	II-A	50	
	II-B	10	
Surgical appliances	II-C	1	
Surgical bandage and supports.	II-C	26	
Surgical bulbs	II-A	41	
Surgical equipment	IV	B	See molded wheels.
Surgical instrument parts.	II-A	39	
Surgical tape	II-A	40	
Surgical tubes and tubing.	II-A	39	
	II-B	1	
Swab rubbers, oil well.	II-A	18	
Swimming pool hose	III		
Switchboard mats	IV	B	See mats.
Syringe tubing	II-A	45	
Syringes, combination.	II-A	41	
Table tops	III		
	IV	B	
Tabs, zipper	IV	B	See zipper tabs.
Tacks, bumper	III		See bumper tacks.
	IV	B	See bumper tacks.
Tail-pipe supports	II-C	4	
Tailwheels, airplane	IV	B	See molded wheels.
Tank balls	II-A	36	
Tank fenders and flaps.	IV	B	
Tank floats	III		
Tank pads and linings.	IV	A	See sponge.
Tanks, lined	II-A	10	
Tanks, hard rubber	III		See hard rubber.
Tanks, X-ray	III		See hard rubber.
Tape, friction	II-C	13	
	IV	A	See friction.
Tape, horticultural binding.	III		See horticultural.
Tape, pressure sensitive.	II-C	22	
Tape, surgical	II-A	40	
Tapes (shoes)	II-C	16	
Taps, conductive	II-A	56	
Taps (shoes)	II-C	15	
Taps, stick-on	III		See stick-on soles and taps.
Telephone bases	III		
	IV	B	
Telephone cord protectors.	III		
Telephone protectors.	III		
Tennis balls	II-C	3	
Tent fabrics	IV	B	
Terminal blocks	II-A	15	
Testing rubbers, oil well.	II-A	18	
Test tube holders	III		
Textile machinery parts.	III		See lug straps, etc.
Thermometer cases	III		
Thermoplastic coatings.	III		
Thermos bottle parts.	III		
Thermostat covers	IV	B	
Thread	III		See rubber thread.
	IV	B	See rubber thread.
Tile and tiling	IV	B	
Tile flooring	III		See flooring, etc.
Tire airbags	II-A	30	
Tire blowout shoes	III		See blowout shoes.
Tire, cord dip	II-B	18	
Tire flaps	II-A	30	
Tire reliners	III		
Tire repair materials	II-A	33	
	II-C	29	
	III		
Tire tubes	II-A	30	
Tire valve stems	IV	B	See valve stems.
Tire valves	II-A	30	
Tires, bicycle	II-C	33	
Tires, lawnmower	III		
	IV	B	See wheelbarrow.
Tires, pneumatic, solid & cushion.	II-A	30	
Tires, tractor and implement.	IV	B	See tractor.
Tires, vacuum cleaner.	III		See vacuum cleaner.
Tires, wheelbarrow	III		
	IV	B	
Toggle straps	III		
Toilet closet gaskets	III		
	IV	A	
Toilet seat bumpers	III		
	IV	A	
Toilet seats	IV	B	
Tools, insulated	II-A	15	
Tools, painters' graining.	III		See painters' graining.
Top-lifts (shoes)	II-C	15	
Tourniquets	II-A	46	
Toy stamps	II-A	26	
	II-A	27	
Tractor and implement tires.	IV	B	
Transmission belts	II-A	5	
	II-B	14	
Transmission mountings.	II-A	29	
Trays, corrosive materials.	II-A	9	
Trays, explosive materials.	II-A	9	
Trays, foot bath	III		See foot bath trays.
	IV	B	See foot bath trays.
Trays, hard rubber	III		See hard rubber photographic trays.
Trays, ice cube	III		See ice cube trays.
Trays, insulation	II-A	9	
	II-B	13	
Trays, refrigerator	III		See refrigerator freezing trays.
Trays, serving	IV	B	See serving trays.
Tread repair stock	II-A	33	
	II-C	29	
Treadle connections	IV	A	See accelerator treadle connections.
Treads, stair	III		See stair and step treads.
	IV	B	See stair and step treads.
Tree lighting devices	III		See Christmas tree.
Trolley wire guard	III		
Truck tires	II-A	30	
Truss pads	II-A	42	
	II-C	25	

Product	Schedule	Group	Remarks
Trusses	II-C	26	
Tube repair materials.	II-A	33	
	II-C	29	
	III	-------	See tire and tube repair materials.
Tubes and tubing, medical, etc.	II-A	39	
	II-B	1	
Tubes, bicycle	II-C	33	
Tubes, photographers'.	III	-------	See photographers' bulbs.
Tubes, tire	II-A	30	
Tubing, beer	III	-------	See beer tubing.
Tubing, braided	II-C	18	
Tubing, cable covering.	II-C	18	
Tubing, fire extinguisher.	II-C	18	
Tubing, gasoline	III	-------	See gasoline tubing.
Tubing, hard rubber.	II-A	15	
Tubing, milking machine.	II-A	24	
Tubing, mine	II-B	15	
	II-A	20	
Tubing, pump	II-C	18	
Tubing, shaft covering.	II-C	18	
Tubing, syringe	II-A	45	
Tubing, windlace	III	-------	See windlace & windlace tubing.
Tubing, windshield wiper.	II-C	18	
Typewriter erasers	IV	A	See erasers.
Typewriter keys	III	-------	
	IV	B	
Typewriter silencers	III	-------	
Umbilical belts	II-C	26	
Upholstery	III	-------	See cushions.
Upholstery, artificial	IV	B	See artificial.
Urinals	II-A	39	
	II-B	1	
V-belt shock absorbers.	III	-------	

Product	Schedule	Group	Remarks
V-belts	II-A	7	
	II-B	14	
	II-C	6	
Vaccine caps	II-A	39	
Vacuum brake hose	II-A	29	
Vacuum brake parts	II-A	29	
Vacuum breaker gaskets.	II-C	27	
Vacuum cleaner belts.	II-A	61	
Vacuum cleaner bumpers.	III	-------	
Vacuum cleaner tires.	III	-------	
Vacuum cleaner tubing.	II-C	18	
Valve stems	IV	B	
Valves	II-A	9	
Valves, back flow	II-C	27	
Valves, bicycle tire	II-C	33	
Valves, insulation	II-B	13	
Valves, oil well	II-A	18	
Valves, tire	II-A	30	
Ventilating tubing, mine.	II-A	20	
	II-B	15	
Veterinary bulbs	II-A	41	
Veterinary instrument parts.	II-A	39	
Veterinary sleeves	II-B	2	
Veterinary tubes and tubing.	II-A	39	
	II-B	1	
Vibration dampers	II-A	29	
	II-A	65	
Wainscoting	III	-------	See flooring.
	IV	B	
Washers, ball cock	II-A	36	
Washers, basin	III	-------	See basin washers.
Washers, bibb	II-A	36	
Washers, flush valve	II-C	27	
Washers, float valve	II-C	27	
Washers, hose	II-A	20	
Washers, overflow	II-C	27	
Washers, siphon	II-C	27	
Washers, slip joint	III	-------	See slip joint washers.
Washers, spud	II-C	27	

Product	Schedule	Group	Remarks
Washers, waste	II-C	27	
Washing machine drain hose.	III	-------	
Washing machine parts.	II-C	20	
Water bags, canvas	IV	B	See canvas.
Water bottles	II-A	41	
Water, hose	II-C	18	
	IV	A	
Weatherstrip	III	-------	
	IV	A	
Webbing, elastic	II-C	26	
Welding hose	II-A	8	
Welting, fender	IV	B	See fender.
Wet plate negative solution.	II-A	28	
Wheelbarrow tires	III	-------	
	IV	B	
Wheels, molded	III	-------	See molded wheels.
	IV	B	See molded wheels.
Wheels, steering	IV	B	See steering.
Whiskey hose	III	-------	
Windlace, tubing	III	-------	
Window squeegees	IV	B	
Windshield wiper blades.	II-A	29	
Windshield wiper gaskets.	II-A	29	
Windshield wiper tubing.	II-C	18	
Windshield wipers.	IV	B	See window squeegees.
Wipers, plate	IV	B	See plate wipers.
Wire guard, trolley	III	-------	See trolley wire.
Wire, insulating compounds.	II-A	1	
Workshoes	II-A	34	
Wrestling matcovers	IV	B	
Wringers, photo	III	-------	See photowringers.
X-ray aprons	II-A	39	
X-ray cooling hose	II-A	39	
X-ray sheets	II-A	39	
X-ray tanks	III	-------	See hard rubber.
X-ray trays	III	-------	See hard rubber.
Yarning material	III	-------	
Zipper tabs	IV	B	

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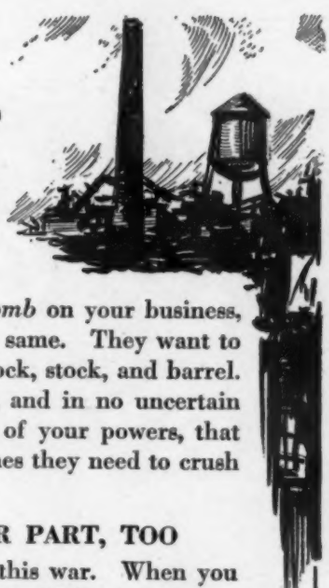

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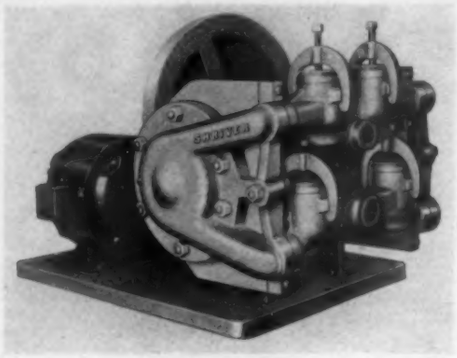
A new feature added to the line of diaphragm pumps manufactured by T. Shriver & Co., Harrison, N. J., is a streamlined top feed, bottom discharge unit which is adapted particularly for handling slurries or



suspensions which contain a high percentage of crystalline or quick settling solids which may be corrosive, abrasive, heavy or valuable, delicate or hazardous. The material is fed into the upper manifold through the ball valves and into the heads at each end of the pump in a clean sweeping motion, thereby assuring that with each forward motion of the diaphragm covered piston, the material is forced out through the lower pair of ball valves and out through the lower manifold. This does not permit settling or accumulation of solids in the pump heads.

Positive displacement of the material is effected by means of the double acting pistons which are always immersed in a bath of lubricating oil. Since the working mechanism is entirely separated from the liquid heads by rubber diaphragms, there can be no effect by the material on the mechanism. Thus the only parts of the pump which need be made of whatever metal or rubber-covered metal that is best suited to the conditions are the liquid heads, ball valves and manifolding.

An interesting feature of the pump is the interchangeability of the valve manifolds so that the pump may be fed from the bottom and discharged at the top, if desired.

Self-Cleaning Tubular Heat Exchanger

The Davis Engineering Corp., of Elizabeth, N. J., designers and manufacturers of heat exchange equipment for industrial application, recently developed the Paracoil Self Cleaning Tubular Heat Exchanger. This new unit is said to eliminate the necessity for manually or chemically cleaning apparatus of this nature. A few turns of a hand wheel, while the heat exchanger is in operation, restores the surface in contact with the medium being heated or cooled to its original clean condition.

Previously, in industry, where the product required heat exchange apparatus to heat or cool a substance,

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In the Rubber Industry these emulsions are being used today as *Latex Modifiers* and *Complete Latex Replacements* to extend, thicken, stabilize, increase penetration, improve resistance to acids, oils and solvents; *in Coatings* to produce adherent pigmented or clear coatings on paper, fabric, and rubber and as intermediate coats for lacquer on rubberized cloth; in *Rubberizing* textiles; in *Latex Treated Papers* to increase strength and improve ageing; in *Adhesives*, for paper, for leather to cloth, and cloth to cloth.

These are just a few of the known applications in the rubber field. Undoubtedly in your own plant you will find many uses for these emulsions to improve your products and extend the supply of the vital materials, LATEX, RECLAIMS, and SYNTHETICS.

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ALKYD 17-B A permanently tacky, alkyd type resin emulsion containing 40% solids. When mixed in equal proportions with normal latex, the mixture for all practical adhesive purposes is indistinguishable from latex.

ALKYD 18 An alkyd type resin emulsion which is non-yellowing and non-oxidizing. Film is water-white and non-tacky. Preferred where slight oxidizing action may be considered harmful to rubber. Extender for latex in coating, combining and impregnating processes.

EMULSION 58-8 A series of emulsified elastomers containing up to 65% solids. Recommended for use as full latex replacements in impregnation and combining.

PIGMENT BASES Concentrated aqueous dispersions of pigments in resin bases, available in all shades and viscosities, suitable for spreading, spraying, etc.

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the heat exchanger became fouled due to the affinity of the medium or its component parts adhering to the surface transmitting the heat. This condition, if not corrected, caused the heat exchanger to operate inefficiently and often become inoperative. To correct such a condition two methods were employed—either the heat exchanger was disconnected from the system in order to be disassembled and manually cleaned, or if the process permitted, a solvent was circulated through the heat exchanger where the fouling was known to have occurred. Either method achieved the desired result—returning the heat exchanger or apparatus to its original clean condition, but not without cost of labor, materials and the loss of production.

The Paracoil Heat Exchanger is suitable for liquids of a viscous nature containing organic or inorganic substances. It can be supplied in various commercial sizes and of materials to resist the corrosive action of the material being heated or cooled. There is no internal mechanism to get out of order or require replacement due to normal wear. If, during the life of the apparatus replacement of the heating surface is necessary, a new tube bundle can be supplied and installed. The cleaning device can be operated as often as desired or as found necessary for the particular medium being heated or cooled.

Hyper-Reset for Fast Stabilizing Control

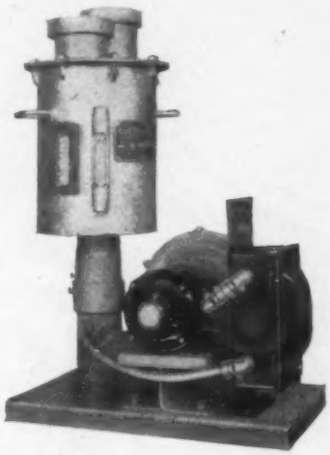
A new development in the field of control engineering, said to be of unusual importance, has been announced by the Foxboro Co., Foxboro, Mass., under the name of Hyper-Reset. This is not an instrument or a mechanism, but a control function, available in the newly-designed Model 30 Stabilog Controller, for application where process-lag is considerable. Its importance is demonstrated by tests in which Hyper-Reset consistently re-established process stabilization, following an upset, in one-quarter of the time, and with only one-half the upset effect, as compared with a similar controller having only the usual reset. Hyper-Reset reduces the effects of a process disturbance by making initial temporary additional corrections, which are proportional to the rates of change of the measured value caused by the disturbance. The normal reset follows, establishing stabilization. But the several control functions carried out by Hyper-Reset are simultaneously and automatically adjusted. No tuning-in is necessary. No more than two process adjustments are required, proportional and Hyper-Reset.

Improved Rubber Belt Vulcanizer

A change in design of its Rubber Belt Vulcanizer No. 28 so the unit will now take belts up to 34 inches in width when the unit is set square across the belt has been announced by the B. F. Goodrich Co., Akron, Ohio. It will also handle 28-inch belts with the assembly at about a 22 degree angle. A 16-inch belt can be jointed with the unit at 45 degrees. The improved design has 11 by 36½-inch platens and measures 41 inches in overall length. It weighs 380 pounds. The belt is gripped and pressure is applied by tightening nuts on for corner bolts. Heat is applied electrically. The assembly includes a curing pad, sheet-iron platen covers, and two 25-foot lengths of extension cord. The new design is known as Square End No. 28.

Pittsburgh Lectrobreathers

Designed to prevent the entrance of atmospheric moisture into oil and chemical tanks, Lectrobreathers have been introduced by the Pittsburgh Lectrodryer Corp., 1082 Thirty-Second St., Pittsburgh, Penna. These new devices permit only dry air to enter the



tank when it is emptied or when air enters due to temperature drops. Air leaving the tank, being thoroughly dry, has a partial reactivating effect which makes possible long periods between reactivations. They are mounted either directly on the tank or piped to it and are equipped with a color indicator for determining when reactivation is needed or when it is complete. Where Lectrobreathers are required for several tanks, the standard practice is to use one Lectrobreather on each tank and a central reactivator for all breathers. The reactivators are built for electric operation as standard for all units or for steam operation on the two larger units. Special Lectrobreathers are available for use on transformers or other equipment where atmospheric moisture is harmful. Lectrobreathers use Activated Aluminas, which are dependable, time-tested adsorbents. They operate on the same principle as Lectrodryer equipment which is successfully used in many industries for drying compressed air, gases and for maintaining lower than normal relative humidities in rooms.

Stimulated by wartime production requirements for positive balancing equipment having extraordinary capacities, the Gisholt Machine Co., Madison, Wisconsin, have broadened the range of its line of **Dynetric Balancing Machines** to extremes of 1 ounce and 50 tons.

An improved type of **hydraulic lift truck** particularly designed for the handling of heavy loads has been introduced by the West Bend Equipment Corp., West Bend, Wisconsin. Marketed as the Model L Weld-Bilt, it has a capacity of 10,000 lbs.

Cochrane Corporation, Philadelphia, Penna., has developed a **high pressure flow meter** which is said to be successful in high pressure process operations in the neighborhood of 5,000 lbs./sq. in.

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RUBBER STRIP CUTTER

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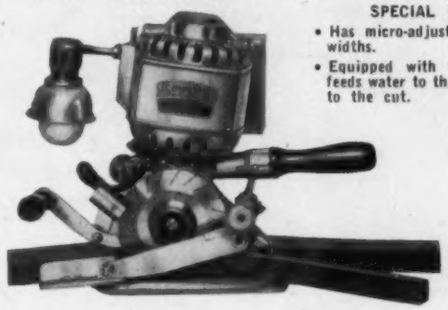

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Here's a way makers of rubber goods are helping conserve rubber: A shop-coating of a special wax finish (formulated by the makers of Johnson's Wax) retards deterioration by preventing oxidation.

On a wide variety of rubber articles these special Johnson's Wax Finishes have been used with great success. The finishes are easy to apply, water repellent, non-flammable. And their protective, non-porous coating gives rubber surfaces a long-lasting lustre.

A gallon of Johnson's Wax Finishes covers 2,000 feet, or higher. These economical dressings may be applied by dipping, spraying or wiping. Available in 5 and 55 gallon drums. Also in 1 gallon containers.

For samples and further information, write

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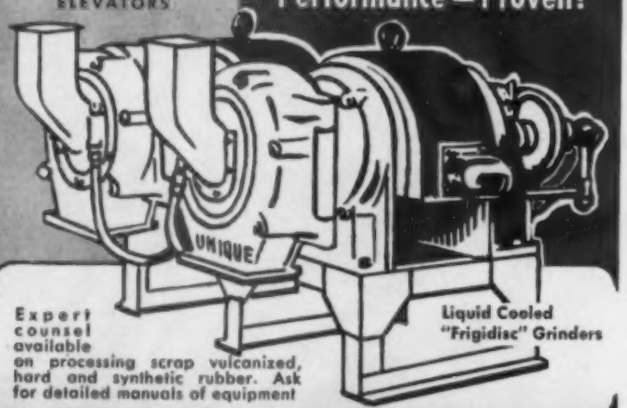

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REVIEWS

BOOKS

Natural and Synthetic High Polymers. By K. H. Meyer. Translated by L. E. R. Picken. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y. 6 x 9 in. 690 pp. $11.00.

(Available from *Book Department,* RUBBER AGE)

This book, the fourth volume in the High Polymer Series being published by Interscience Publishers, is actually complementary to the second volume in the series: *The Physical Chemistry of High Polymeric Systems,* by H. Mark. The two books are designed to replace a second edition of a short monograph published in German by the two authors about twelve years ago. Certain general lines in the field of high polymer chemistry suggested in the earlier German work are extended in the present volume.

The book contains a great deal of theory on the highly individual behavior of high polymeric compounds. From this angle, the author has proceeded from the standpoint that all those phenomena frequently regarded as peculiar to high polymers are to be referred, in a last analysis, to the interplay of atomic forces of attraction and thermal agitation, as in the behavior of compounds of low molecular weight. In many cases it was necessary for the author to put forth a theory where none existed before. Furthermore, as in the treatment of rubber, gutta-percha, and starch, it was necessary to undertake experimental work in order to obtain insight into obscure relationships. Since the results of these investigations are published for the first time, the volume is a doubly welcome addition to the technical literature.

Naturally, no discussion of natural or synthetic high polymers would be complete without a review of natural and synthetic rubbers. Accordingly, the author devotes approximately seventy-five pages to these materials in three separate sections: Rubber and Gutta-Percha, Physical Properties of Rubber, and Artificial or "Synthetic" Rubbers. (The quotations are those of the author). These are included in the chapter on "High Polymeric Hydrocarbons and Their Derivatives." The literature is well reviewed, and, as noted before, several new contributions based on personal work are included.

The book is divided into eleven chapters as follows: The Study of High Polymers; Inorganic High Polymers; High-Polymeric Hydrocarbons and Their Derivatives; Polymeric Ethers, Esters, Sulfides, etc.; Cellulose and Its Derivatives; Substances Related to or Associated with Cellulose; Starch and Related Carbohydrates; Proteins; Properties of High Polymers in Solution; Films, Foils and Membranes; and Molecular Structure of Animal and Plant Tissues. In addition, there is an eight-page introduction, in which high polymers are defined and classified and the morphological approach to the chemistry of high polymers is discussed, as well as complete author and subject indexes.

•

Strategic Materials in Hemisphere Defense. By M. S. Hessel, Walter Murphy and F. A. Hessel. Published by Hastings House, 67 West 44th St., New York, N. Y. 5½ x 8 in. 235 pp. $2.50.

Although every single issue of the daily press brings home the fact to the public that the United Nations face a serious problem of supply of certain strategic materials the full weight of the problem is generally lost on the average layman because of the dullness of the statistics cited. The authors of this book, realizing this phase, have translated the statistics into readable literature. The "translation" is well done.

The book treats with the fourteen strategic and fifteen

critical materials on the Army's list and discusses their sources, potential sources, their uses and our needs. Pictographic diagrams are used to translate the figures into visual comparisons, following the Chinese proverb. Special emphasis is placed on consumer goods and the effects on the home and average citizen.

Rubber, of course, is one of the strategic and critical materials and is the first material discussed by the authors. The shift of rubber cultivation from the Western Hemisphere to the Far East is traced, statistics are liberally quoted, and present developments in the production of synthetic rubber are outlined. Other materials discussed include tin, manganese, graphite, aluminum, asbestos, mercury, quinine and jute. The role played by Latin America in helping to make up deficiencies in these materials is told. Incidentally, Walter Murphy, one of the authors, is editor of *Chemical Industries.*

•

New Technical and Commercial Dictionary. Compiled by Antonio Perol Guerrero. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 6 x 9 in. 600 pp. $10.00.

This is a new Spanish-English, English-Spanish dictionary containing more than 50,000 words used in the electrical, chemical, mechanical, marine, radio, mining, textile and other industries. It attempts to set a standard of terminology for all technical and commercial words and accordingly includes modern words which are peculiar to mechanized and motorized warfare, aviation, meteorology, etc. During the compilation, the most important Spanish-English dictionaries already available were carefully studied as were glossaries of the latest scientific terminology. The definitions are concise and the type is clear and legible. The dictionary also contains conversion tables of weights and measures and monies alongside of the literal translations.

BOOKLETS, CATALOGS, Etc.

Motor Truck Facts: 1942. Automobile Manufacturers Association, Transportation Building, Washington, D. C. 6 x 8½ in. 56 pp.

As indicated by its title, this booklet contains data on motor trucks compiled in the last year. It is replete with statistics, tables giving truck factory sales, registration of motor trucks by states, truck registration by size of community, trucks operated by fleets, etc. Government orders pertaining to the industry are also included. An index makes the location of any particular subject an easy matter.

•

Atlantic Industrial Rubber Products. (Catalog 21CE). Atlantic India Rubber Works, Inc., 1453 West Van Buren St., Chicago, Ill. 8½ x 11 in. 104 pp.

The multitudinous industrial rubber products sold by the company are described and illustrated in this new catalog. Such stock items as grommets, bushings, bumpers, balls, gaskets, cord rings, tubing, vacuum cups, washers, spring rubber, sheet rubber, sponge rubber, and others are included. The entire catalog has been adroitly handled and all information supplied is clearly stated.

•

Brush Sifters. (Catalog No. 27-A). Robinson Manufacturing Co., Muncy, Penna. 8½ x 11 in. 8 pp.

This catalog, prepared for the food, drug, chemical and allied industries, describes and illustrates the varied line of brush sifters manufactured by the company. Much of the material it contains is entirely new and all of it is completely revised to answer present day problems. Standard and special sifters are included.

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Crown Rubber Clay — *Carbon Black*
Rubber Chemicals — *Rubber Colors*

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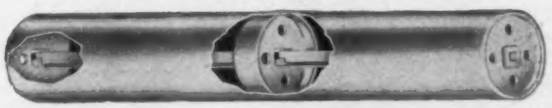

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Stearns magnetic clutches and brakes offer smooth, efficient operation with near or remote control. Bulletin 225.
Stearns Improved Air Cooled Magnetic Pulley
Processing scrap rubber requires Stearns Magnetic pulleys or other types of magnetic separators. For economical, automatic, efficient protection against costly shutdowns due to tramp iron damage, Stearns Magnetic equipment will pay for itself many times over—a definitely profitable investment.
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REVIEWS (CONT'D)

The Surface Area of Colloidal Carbons. I. Measurement by the Electron Microscope. II. Role in Rubber Reinforcement. (Vol. III in the series of "Columbian Colloidal Carbons"). Columbian Carbon Co. (Binney & Smith Co., Distributors), 41 East 42nd St., New York City. 5½ x 7¾ in. 96 pp.

With the electron microscope it is now possible to attempt the quantitative evaluation of surface area as a clue to rubber compounding and other physical and chemical properties. In the studies presented in this booklet, third in the series on colloidal carbons presented to date by Columbian Carbon, the carbon spectrum is analyzed from this point of view. Surface area is shown to be the dominating influence subject, however, to important and sometimes controlling anomalies. These are shown to be largely resolved on the assumption that carbon structure, in addition to surface area, plays an important role. The studies also indicate that the role played by surface area is even more essential in the case of the synthetic rubbers than in the case of natural rubber. The importance of carbon structure has likewise been confirmed. As usual, the booklet is well printed, is replete with charts and tables and includes a complete bibliography.

•

Koroseal Handbook of Technical Information. B. F. Goodrich Co., Akron, Ohio. 8½ x 11 in. 24 pp.

The complete story of Koroseal, and its derivatives, Korolac and Korogel, is told for the first time in this concise handbook. The manufacture of Koroseal and its related products is first traced and then the physical, chemical, electrical and processing characteristics of Koroseal compounds are discussed. A complete description of the tests used in determining the properties of this synthetic is included. Several charts are contained in the handbook showing among others the effect of quantity of plasticizer, the electrical effect of aging, differences in plasticizers, and the physical effects of various pigments. Koroseal's physical constants are shown in table form.

•

Rubber Guide Book for American War Industries. B. F. Goodrich Co., Akron, Ohio. 8½ x 11 in. 32 pp.

Designed to present maximum information in easily accessible, indexed, condensed form, this guide book lists the application and properties of many types of products for industrial and aeronautical purposes using natural, synthetic or reclaimed rubber. In addition, sub-zero test data, diameter, volume, thickness and hardness tests in oil, and suggested use for various Ameripol compounds are given. Cross-sectional drawings add to the clarity of the presentation. A review of sponge, lathe cut and hard rubber processes using either natural, synthetic or reclaimed rubber is included.

•

Automatic Control of Synthetic Rubber Processes with Bristol Instruments. Bristol Co., Waterbury, Conn. 8 x 10½ in. 12 pp.

This bulletin contains information on the specific application of automatic control instruments on synthetic rubber processes, especially those concerned with the production of Buna S. It is liberally illustrated with reproductions of typical installations with sketches indicating how the instruments are applied. A discussion of the automatic timing of catalytic dehydrogenation processes is included. A complete list of the company's products is also given.

•

Hi-Tear Micronex. (Chat No. 28). Binney & Smith Co., 41 East 42nd St., New York, N. Y. 8½ x 11 in. 2 pp.

Properties of Hi-Tear Micronex, the latest addition to the line of Micronex carbon blacks sold by the company, are discussed in this bulletin. Recommendations for the use of the new black, which has a pH of 7.0, are also made.

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, SEPT. 12, 1942

Crude Rubber

THE number of contracts signed between the United States and countries in South and Central America, calling for the exclusive purchase of all crude rubber by the Rubber Reserve Co., over and above that needed for domestic consumption in the various Latin American countries, continues to grow. The number of agreements has now reached thirteen, including a pact with Mexico announced just before this issue went to press. Although this agreement had previously been mentioned in the news the pact was not actually signed until this week.

There is a strong possibility at this writing that Colombia may soon equal Brazil in its potentialities as a rubber-producing center. Although details are shrouded in official secrecy, it has been learned that serious consideration is being given to the possibility of turning about half of that country over to the cultivation of crude rubber. Eastern Colombia, which for the most part has never been explored by white men, is understood to possess untold quantities of rubber, but because transportation is limited chiefly to rivers the real exploitation of rubber has never been practiced.

Transportation continues to be the major problem in connection with the development of the rubber producing area in Eastern Colombia, but the adaptation of modern practices may solve this problem. Negotiations are believed to be under way with one of the major airlines in South America for a regular rubber ferry service. If such negotiations are carried to a successful conclusion, then the problem will be one of providing landing fields in the jungles for huge transport planes. This problem, however, may be overcome.

Encouraging reports of the exploitation of rubber continue to come from other sources as well. These include the discovery of 50,000 Castilla trees in an accessible region of Venezuela, a government-sponsored plan for increasing rubber shipments from the Union of South Africa, growing interest in the rubber producing possibilities of Mozambique, and a drive to speed up rubber production in Tanganyika.

Prices shown below are those set by the Rubber Reserve Company:

As of September 12
Fixed Government Prices

Plantations—			
Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.22½
No. 2	—	@	.22¼
No. 3	—	@	.22
No. 4	—	@	.21¾
Thin Latex Crepe	—	@	.23
Thick Latex Crepe	—	@	.23
Brown Crepe, No. 1	—	@	.21½
Brown Crepe, No. 2	—	@	.21
Amber Crepe, No. 2	—	@	.21¼
Amber Crepe, No. 3	—	@	.21
Brown Crepe, Rolled	—	@	.17
Latex—			
Normal, carload lots, tanks	—	@	.2595
Normal, carload lots, drums	—	@	.2825
Conc., carload lots, tanks	—	@	.2765
Conc., carload lots, drums	—	@	.2950
Guayule—			
Ampar	—	@	.28
Paras—			
Up-River, fine	—	@	—
Acre Bolivian, fine	—	@	—
Balata**—			
Surinam Sheet	—	@	.55
Prime Manaos Block	—	@	.50
Peruvian Prime	—	@	.50
Venezuelan Block	—	@	.52

* Prices for import.

Scrap Rubber

According to an announcement made by WPB, the scrap rubber recently collected in the nation-wide campaign, which brought in some 500,000 tons of fairly good scrap, is moving to central receiving stations and reclaiming plants at the rate of 200 cars, approximately 4,000 tons, a day. The central scrap depots throughout the country are being carefully guarded against sabotage and fire, based on suggestions made by the National Fire Protective Association. A surprising quantity of good tire scrap is said to have been brought in during the campaign which, the Baruch Committee says, should be repeated in about a year. Prices shown below are ceilings on typical classifications:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$18.00
Beadless passenger tires	ton	24.00
Mixed truck tires	ton	18.00
Beadless truck tires	ton	24.00
No. 1 passenger peelings	ton	47.50
No. 1 truck peelings	ton	47.50
Gray carcass	ton	47.50
No. 2 passenger tubes	lb.	.07¾
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06¾
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.05¼
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00
Black mechanical scrap, above 1.10	ton	20.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41
CHAFERS			
Carded, American, 1	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36 in.	5.50	lb.	— @	7.818
40x40	36 in.	6.15	lb.	— @	6.991
40x36	36 in.	6.50	lb.	— @	6.615
48x48	40 in.	2.50	lb.	— @	16.200
48x48	40 in.	2.85	lb.	— @	14.210
56x60	40 in.	3.60	lb.	— @	11.944
48x44	40 in.	3.75	lb.	— @	11.066

Note: Prices shown above are ceiling prices set by order of the O.P.A. Quotations are based on an average price of 15-16-inch middling cotton of 20.37c at the ten designated southern markets.

Cotton

Cotton prices have swung in the comparatively narrow range of 53 points since our last report, high being 19.78 on August 29, touched once or twice since, and low 19.25 on August 13. Prices were fairly firm in mid-August, with trade demand appearing to be satisfied at prevailing levels, but prices slumped sharply around August 20 with the news that half of the cotton crop at current levels might go into the loan. The proposal by Secretary of Agriculture Wickard to reduce minimum permissible farm ceilings to parity also contributed to the decline. However, President Roosevelt's statement that his proposed wage and farm stabilization program would permit adjustments to compensate for rising living costs resulted in a reversal of the trend, the price jumping to 19.73 on August 28, an increase of 41 points over the 19.32 prevailing the previous day. The actual price proposals made public a few days later had surprisingly little effect on the market. Prices have fallen off slightly in the last few days, primarily due to hedge selling. Quotations for middling uplands on the Exchange follow:

	Aug. 12	September 12		
	Close	High	Low	Close
October	17.89	18.30	18.23	18.25
December	18.06	18.53	18.46	18.47
March	18.23	18.67	18.59	18.60

Reclaimed Rubber

For the first time in many months the demand for reclaimed rubber is less than the actual supply. This situation, brought about by the large supply of scrap turned up in the recent nation-wide salvage campaign and new restrictions placed on the use of reclaim, is believed to be temporary only, and reclaimers anticipate greatly increased demand which will tax production capacities again shortly. Although most reclaiming plants are operating at full capacity, a few have dropped to 80% or less, reflecting the current trend in the field. Reclaim, like all rubbers, is now under allocation. Prices shown below are ceilings on typical grades:

Shoe			
Unwashed	lb.	.07 @	.07¼
Tube			
Black Tube	lb.	.11¼ @	.11½
Red Tube	lb	.12 @	.12¼
Tires			
Black (acid process)	lb.	.07½ @	.07¾
Black, selected tires	lb.	.06½ @	.06¾
Truck, Heavy Gravity	lb.	.08½ @	.08¾
Miscellaneous			
Mechanical blends	lb.	.04½ @	.05½
White	lb.	.13 @	.13¼

Ducks

Enameling (single filling)	lb.	— @	.43¼
Belting and Hose	lb.	— @	.39
Single filling, A grade	lb.	— @	.19¾
Double filling, A grade	lb.	— @	.20¾

CHEMICAL MARKETS

New York, Sept. 14, 1942
All Prices F.O.B. Works

ACCELERATORS

Organic

A-1 (Thiocarbanilid)	lb.	.28 @	.33
A-10	lb.	.36 @	.42
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.60 @	.70
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.43 @	.45
Beutene	lb.	.59 @	.64
B-J-F	lb.	.38 @	.43
Butyl Zimate	lb.	— @	1.13
Captax	lb.	.38 @	.40
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.36
El-Sixty	lb.	.40 @	.47
Ethyl Zimate	lb.	— @	1.13
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.34 @	.39
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Ledate	lb.	— @	1.48
Methyl Tuads	lb.	— @	1.53
Methyl Zimate	lb.	— @	1.23
Monex	lb.	— @	1.53
Pentex	lb.	.74 @	.84
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.65
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	1.55 @	1.70
Rotax	lb.	.48 @	.50
Safex	lb.	1.15 @	1.25
Selenac	lb.	— @	1.98
SPDX	lb.	.70 @	.75
Super-Sulfur No. 2	lb.	.13 @	.15
Thiocarbanilid, drums	lb.	.28 @	.33
Thiurad	lb.	— @	1.55
Trimene	lb.	.54 @	.64
base	lb.	1.03 @	1.18
Triphenylguanidine	lb.	.45 @	—
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.50 @	.57
Blend B	lb.	.50 @	.57
Blend C	lb.	.48 @	.55
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—

Inorganic

Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)

Blues [b]			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.17 @	.27
Browns [b]			
Mapico	lb.	.1135 @	—
Umber, Turkey	lb.	.04¼ @	—
Greens [b]			
Chrome	lb.	— @	.25
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimso., 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¼ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.096 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites [b]			
Cryptone No. 19	lb.	.0560 @	.0585
Cryptone CB No. 21	lb.	.0560 @	.0585
Cryptone ZS-800	lb.	.0825 @	.0850
Lithopone:			
Albalith	lb.	.04¼ @	.04½
Astrolith	lb.	.04¼ @	.04½
Azolith	lb.	.04¼ @	.04½
Ray-cal	lb.	.05½ @	.05¾
Rayox	lb.	.14½ @	.15¼
Titanox A	lb.	.14½ @	.14¾
Titanox B	lb.	.05¾ @	.06
Titanox C	lb.	.05½ @	.05¾
Zinc Oxide—American Process [b]			
American Azo: ZZZ (lead free)	lb.	.07¼ @	.07½
Anaconda, lead free	lb.	.07¼ @	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼ @	.07½
XX Red—4	lb.	.07¼ @	.07½
XX Red—72	lb.	.07¼ @	.07½
XX Red—103	lb.	.07¼ @	.07½
Kadox, black label—15	lb.	.07¼ @	.07½
Red label—17	lb.	.07¼ @	.07½
St. Joe, black label	lb.	.07¼ @	.07½
green label	lb.	.07¼ @	.07½
red label	lb.	.07¼ @	.07½
U. S. P.—7, bbls.	lb.	.10½ @	.10¾
Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½ @	.09¾
Green seal—8	lb.	.09 @	.09¼
Red seal—9	lb.	.08½ @	.08¾
Yellows [b]			
Cadmolith	lb.	.55 @	.60
Chrome	lb.	— @	.50
Mapico	lb.	.071 @	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

BLACKS

(In bags, carload lots)

Aerfloted Arrow		.0355 @	—
Certified		.0355 @	—
Certified Spheron		.0355 @	—
Channel "S"		.12 @	—
Continental		.0355 @	—
Dispersо		.0355 @	—
Dixiedensed		.0355 @	—
Dixiedensed 66		.0355 @	—
Excello		.0355 @	—
Furnex		.03½ @	.06
Furnex Beads		.03½ @	.06
Gastex		.03½ @	.06
Kosmobile		.0355 @	—
Kosmobile 66		.0355 @	—
Kosmos-Dixie 20	lb.	.03½ @	.06
Micronex (Amarillo)		.0355 @	—
Micronex Beads (Amarillo)		.0355 @	—
Pelletex		.03½ @	.06
P-33		.0475 @	—
Shell Carbon (Del. Midwest)		.025 @	—
Supreme		.0355 @	—
Thermax		.0225 @	—
Thermax "S"		.0675 @	—
Wyex		.0355 @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00 @	24.50
99½%-300	ton	— @	16.50
86-90%-300	ton	— @	13.50
Asbestine	ton	16.50 @	20.00
Barium carbonate (98-100%)	ton	47.00 @	49.00
Barytes	ton	25.35 @	36.00
Bentonite	ton	11.00 @	16.00
Blanc fixe, dry	ton	60.00 @	67.50
Calcene	ton	37.50 @	43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white	ton	32.50 @	45.00
Clay, Aerfloted, Suprex	ton	11.00 @	23.50
Aerfloted Paragon	ton	10.00 @	22.50
Crown (f.o.b. plant)	ton	11.00 @	—
Dixie	ton	— @	11.00
Langford	ton	— @	8.50
McNamee	ton	— @	10.00
Par	ton	— @	11.00
Witco	ton	10.00 @	—
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	— @	26.00
Kalite No. 3	ton	— @	36.00
Kalvan	ton	— @	100.00
Kalvan "S"	lb.	— @	.09½
Magnesium carbonate	lb.	.06¼ @	—
Mica	ton	35.00 @	44.00
Mineralite	ton	— @	30.00
Pyrax A	ton	— @	7.50
Rottenstone (powd. Dom.)	ton	25.50 @	37.50
Rubberol	lb.	— @	.17½
Silene (calcium silicate)	lb.	.04 @	.045
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00 @	25.00
Whiting, commercial	ton	16.00 @	26.00
Columbia Filler	ton	9.00 @	14.00
Witco	ton	6.00 @	—
Wood Flour (100 mesh)	ton	30.00 @	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00 @	—
Black Diamond	ton	25.00 @	—
Genasco, solid (factory)	ton	— @	—
Hard Hydrocarbon	ton	25.00 @	27.00
MilliMar	lb.	— @	.05½
Parmr, solid	ton	— @	—
Pioneer, MR. solid	ton	— @	—

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00 @	4.50
Rodo #10	lb.	5.00 @	5.50
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.34
Santomerse S	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.22¾ @	.27¾
Tackoi (tackifier)	lb.	.085 @	.18
Tonox	lb.	.50 @	.59
Ty-Ply	gal.	6.75 @	8.00
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38 @	3.63
Nitric, 36 degrees	cwt.	5.00 @	—
Acids, Fatty			
Laurex	lb.	.14¾ @	.17¼
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearite	lb.	.10 @	—

Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.15 @	2.98
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.12 @	.12½
Para-Flux	gal.	.17 @	.18
Para-Lube	lb.	.046 @	.048
Petrolatum, amber [b]	lb.	.03¼ @	.04½
Pigmentaroil, tank cars	gal.	.20½ @	—
in drums	gal.	.26½ @	.27½
Pine, tanks	gal.	.55 @	—
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08¾ @	.18
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.07½ @	.08
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	— @	4.50
Pigmentar, tank cars	gal.	.20½ @	—
in drums	gal.	.26½ @	.27½
Retort Pine Tar, drums.	gal.	.26½ @	.27½
Solvents			
Acetone, pure [a]	lb.	.07 @	.173
Benzene, 90%, tank car.	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.05
Carbon, bisulfide	lb.	.05 @	.08½
Carbon tetrachloride	gal.	.73 @	1.27
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums.	gal.	.48 @	.50
Ethylene dichloride	lb.	.07½ @	.08½
Plastogen	gal.	.07¾ @	.08
Reogen (drums)	lb.	.11½ @	.12
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	.08 @	.09½
Turpentine, spirits	gal.	.69½ @	.73½
dest. dist., drums	gal.	.50 @	.55
Waxes			
Beeswax, white [b]	lb.	.61 @	—
Carnauba, yellow [b]	lb.	.86 @	.88
Ceresin, white, dom.	lb.	.13½ @	.15
Montan, crude	lb.	.45 @	.46
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼ @	—
Refined, 123/125	lb.	.05¼ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95 @	2.05
Gel	lb.	.56 @	.58
Hipar	lb.	.64 @	.66
Powder	lb.	.48 @	.50
Resin	lb.	.48 @	.50
Resin D	lb.	.48 @	.50
White	lb.	1.23 @	1.33
Albasan	lb.	.69 @	.74
Antox	lb.	.54 @	.56
B-L-E	lb.	.48 @	.57
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.48 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.48 @	.57

EXTENDERS

Naftolen	lb.	.15 @	.25
Vanzak	gal.	.05 @	.06

LUBRICANTS—MOLD & RUBBER SURFACE

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Colite	gal.	.90 @	1.15
Dipex	lb.	.06 @	.08
Glycerized Liquid Lubricant	gal.	— @	1.35
Lubrex	lb.	.25 @	.30
Mineralite	ton	— @	30.00
Mold Paste	lb.	.12 @	.18
Sericite	ton	65.00 @	75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.23 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08½ @	.13
White	lb.	.09 @	.15
Brown	lb.	.10 @	.14
Neophax A	lb.	.16½ @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.08 @	.12
Sulfur Chloride, yellow (drs.)	lb.	.03 @	.08
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55 @	—
Commercial (bags)	cwt.	2.20 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

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Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

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Division of United States Rubber Co.
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For Natural & Synthetic Rubber "PICCO" Brand—Plasticizers; Coumarone Resins; Reclaiming Oils, Coal Tar Naphthas.

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A complete line of plasticizers, resins, substitutes, fillers, etc., for Synthetic, Natural and Reclaimed Rubber.

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Akron Savings & Loan Bldg, Akron

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Standard Since 1890

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The Market Place

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overcome odors in rubber—effectively and at low cost.

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BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
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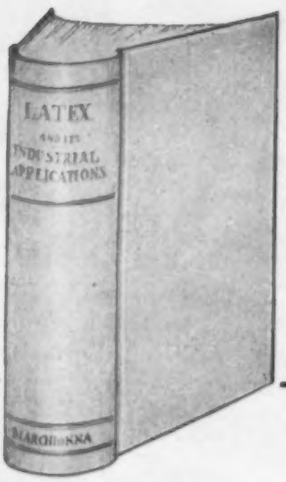

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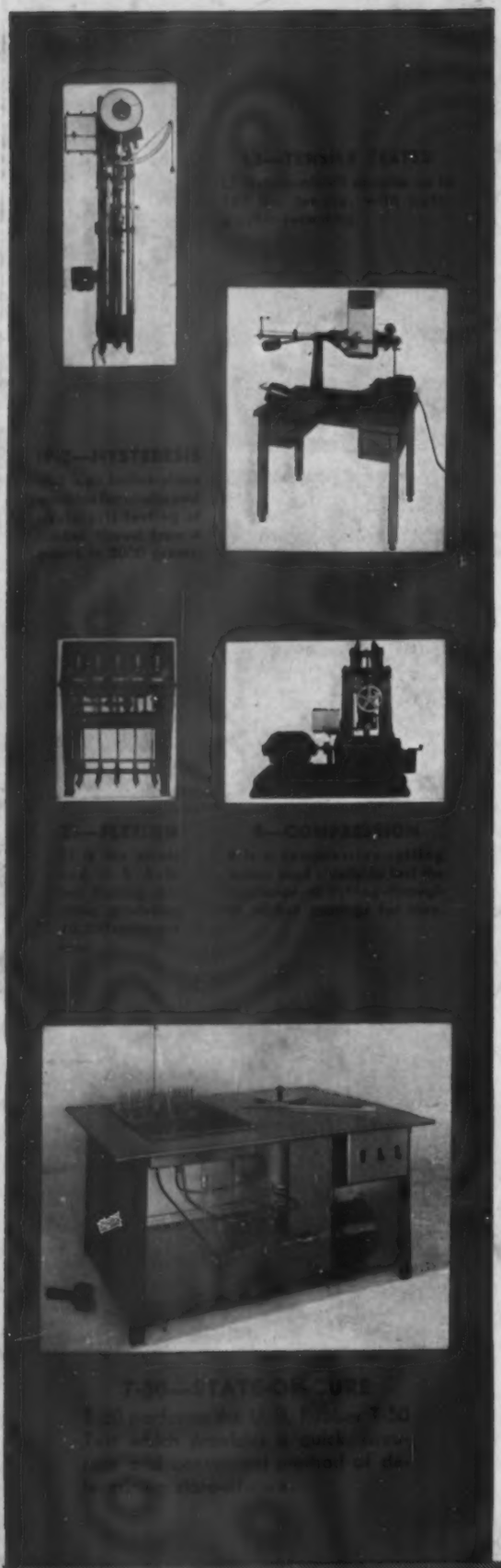

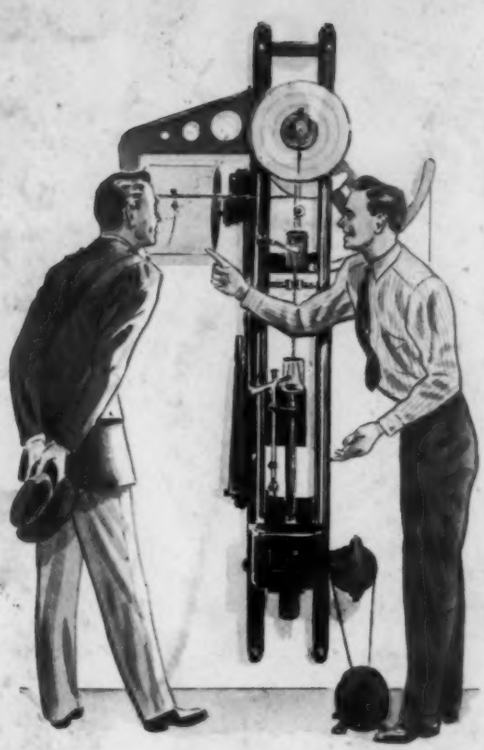

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